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THE FOUNDRY

A TRADE JOURNAL

DEVOTED TO THE INTERESTS OF THE WHOLE FOUNDRY BUSINESS

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MAY 10, 1893.

Vol. II. No. 9.

Published Monthly by THE FOUNDRY PUBLISHING CO.

DETROIT, MICH.

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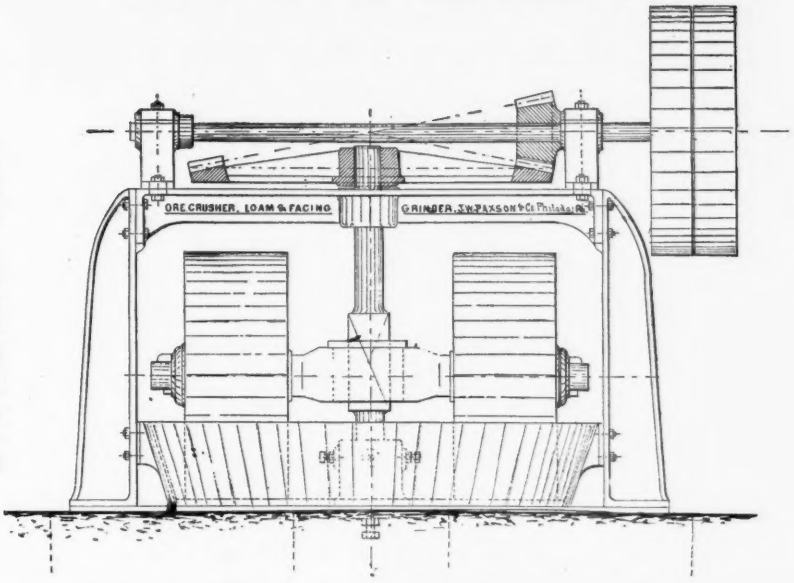

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A Wonder to our Customers,
Puzzle to Our Competitors,
Wash We are Proud of,
Wash YOU would not be without
if you KNEW ITS VALUE.

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Pr. Sam'l J. Smack.

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The Black & Clawson Co.

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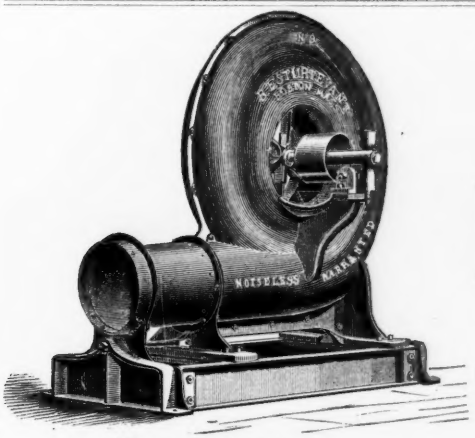

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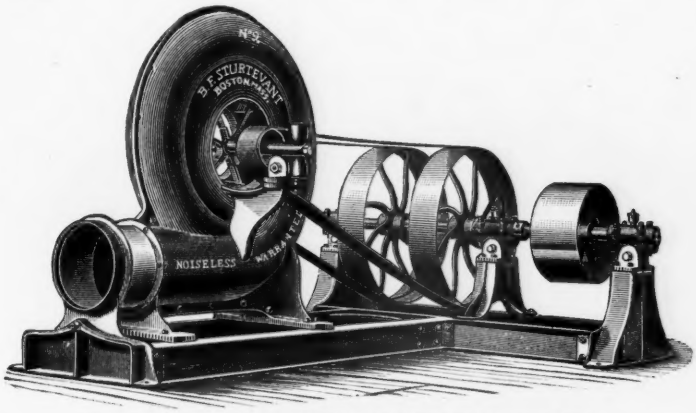

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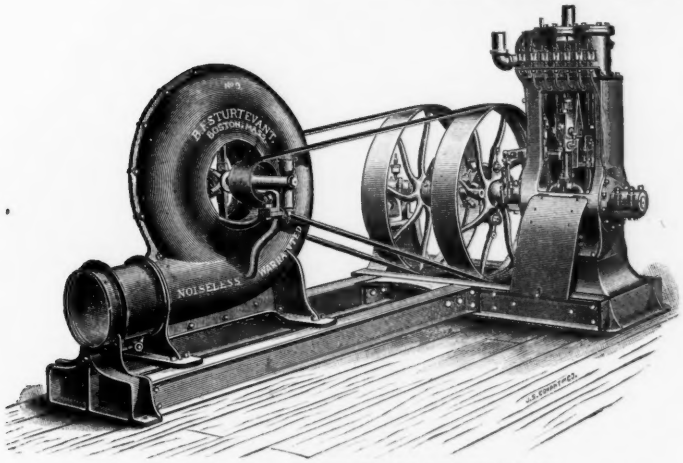

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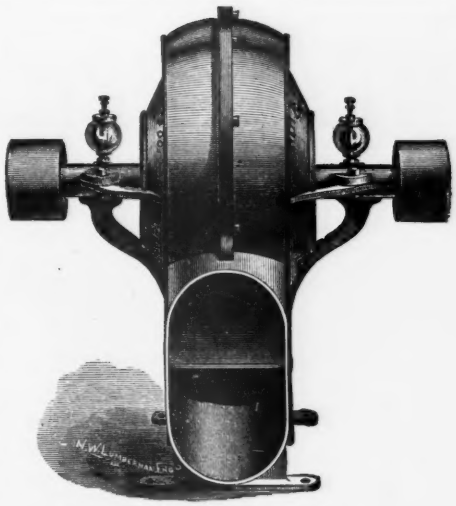

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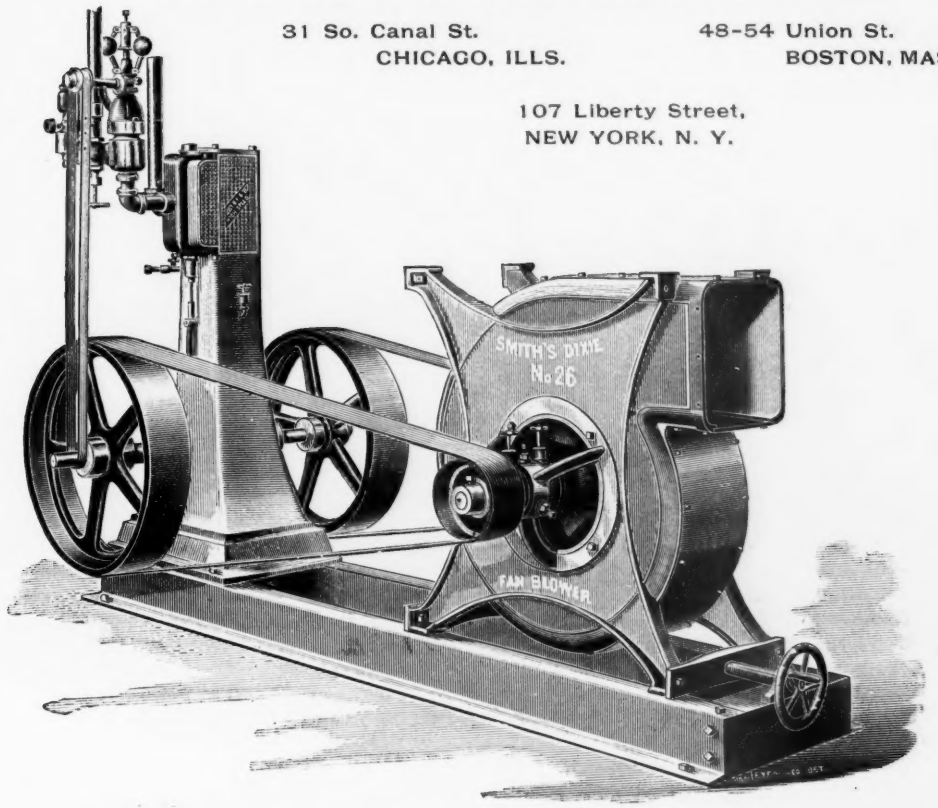

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—MANUFACTURERS OF—

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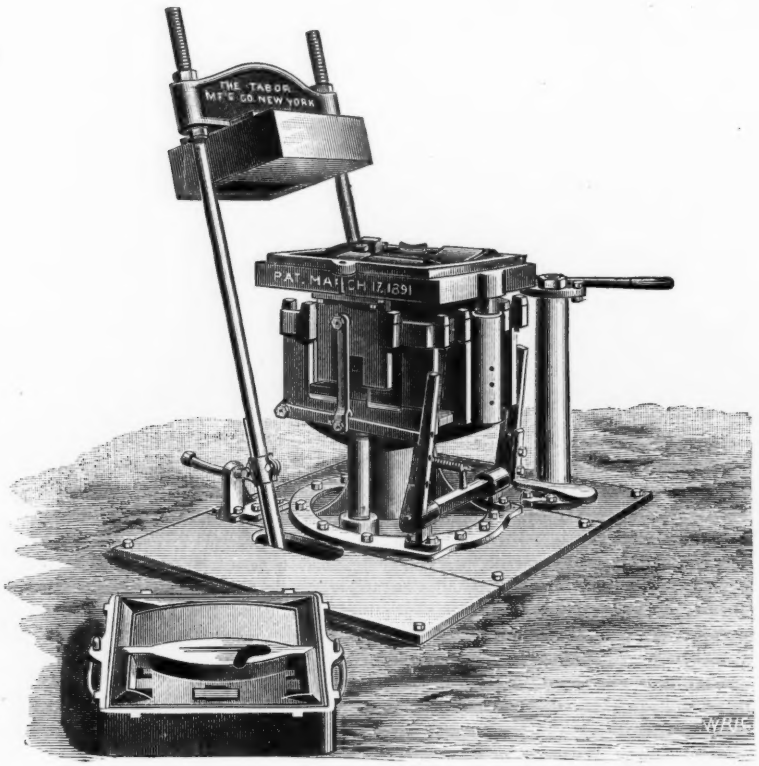

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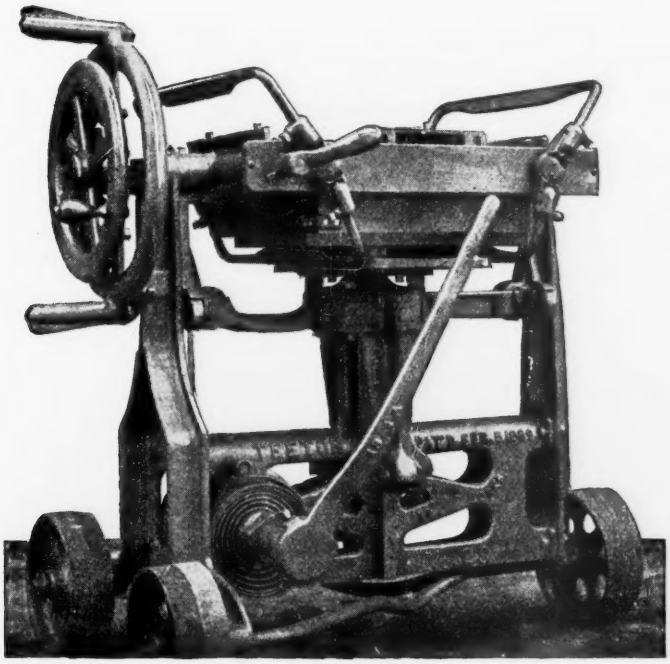

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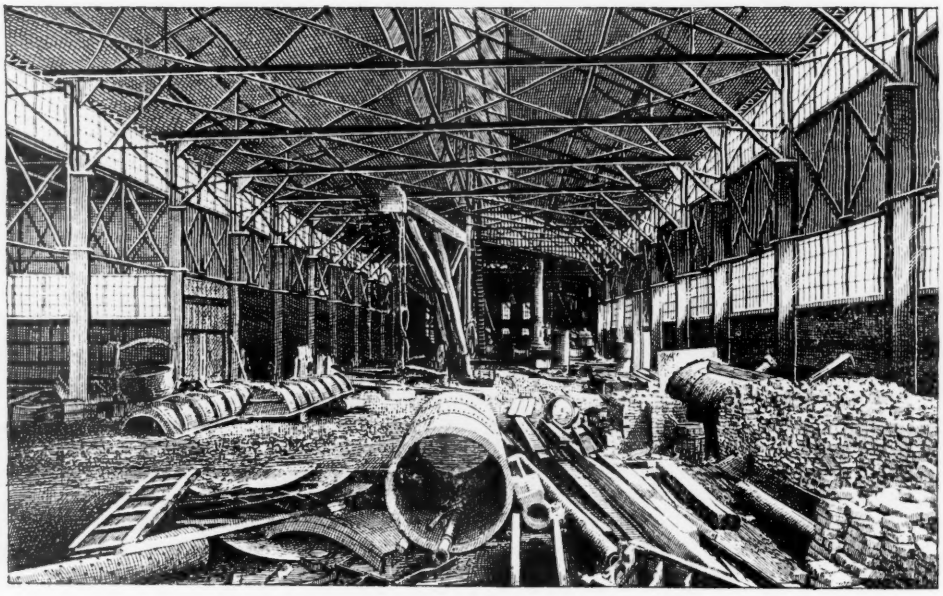

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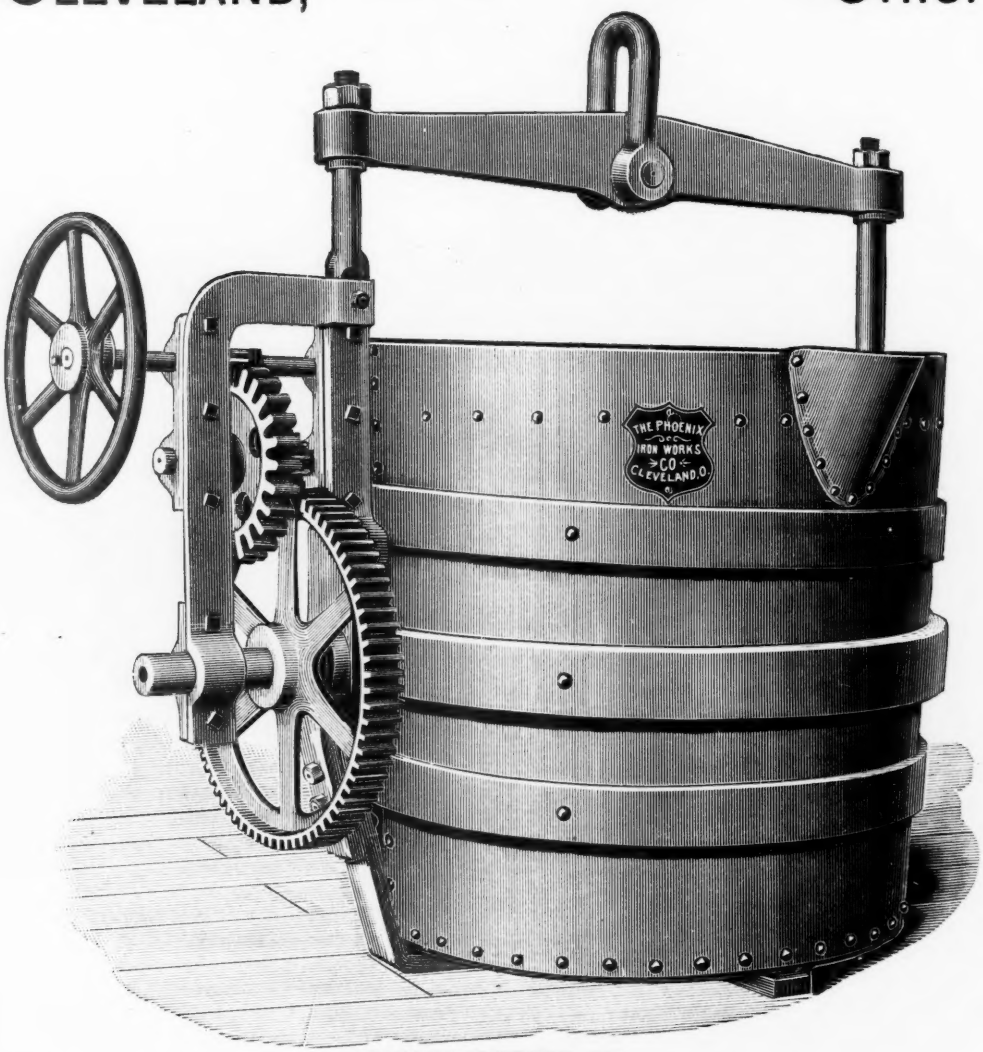
CLEVELAND, - - OHIO.



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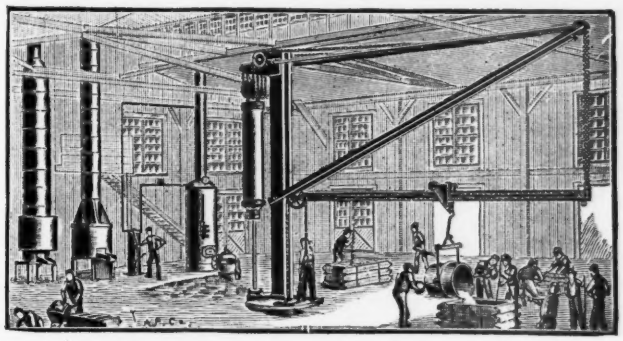

Cut shows 5 ton Crane in Foundry of Diamond State Iron Co., Wilmington, Del.

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One of the Largest Concerns in Cincinnati, Ohio writes:

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Quick Acting and Sure Cranes.

This Crane uses such a trifling amount of steam that it need not be taken into account, even on the most limited supply. The steam used is never missed. The most economical power user known.

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ENGINEERS, FOUNDERS and MACHINISTS.

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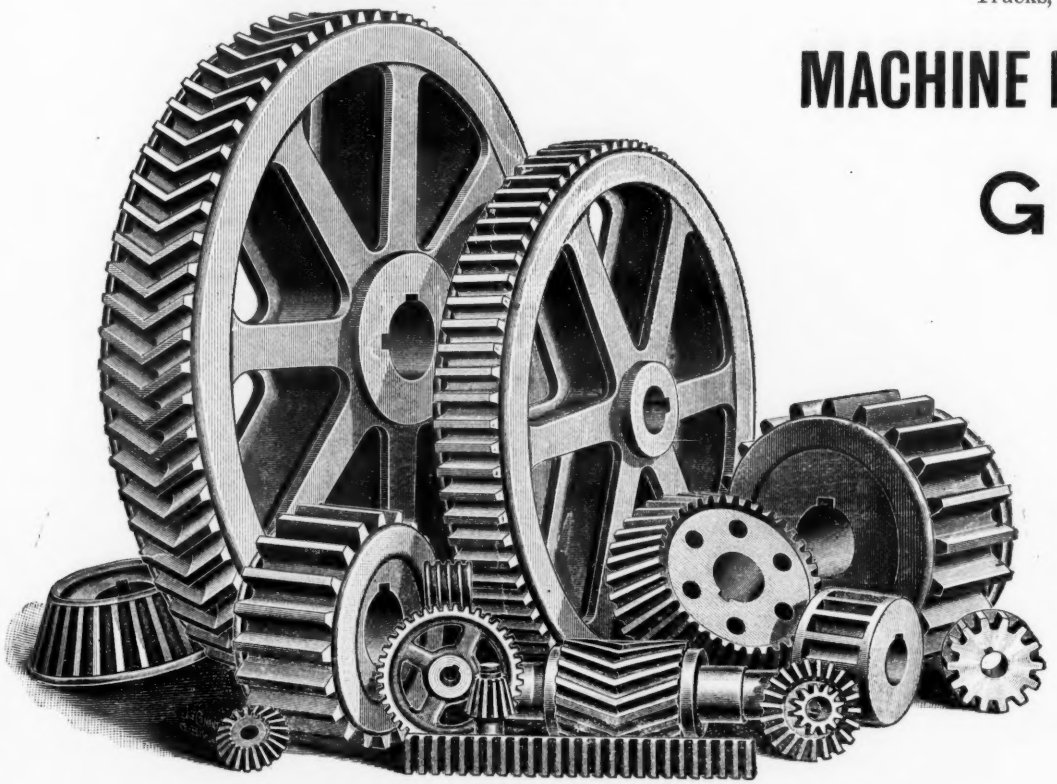

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A Specialty.

IN Accuracy of Pitch, Definition of Form, and Smoothness of Surface, Gears produced by our Patented Machinery are beyond compare. Moreover, extensive experience and scientific experiment, enables us to make our castings of a grade of iron perfectly adapted for strong, durable, Gears. During the last ten years thousands of our Gears have been sent to all parts of the United States, and have given universal satisfaction.

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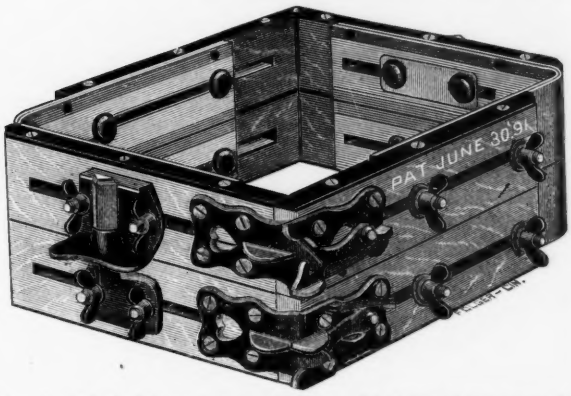

We present to you in the accompanying illustration, our new Adjustable Combination wood and metal snap flask, that can be adjusted to a variety of sizes from 9x10½ to 14x15 inches or any size between, to suit patterns used. The wood parts of the flask are the pieces to which the hinge is attached and also the parts to which the lash is fastened. The steel pieces are the inside lining of flasks. The wood and steel pieces are fastened together with bolts, and by means of a long slot we are enabled to spread the flask to any desired size. The wood parts are of ¾ in. cherry and the steel of 1-8 steel. It has a spring latch which makes it very easy to open and close. It is made so substantial that it will not shift or get out of order while in use. In matching drag with cope, it makes a perfect adjustment of pins that do not shift, which supplies a long felt want in snap flasks. It will suit the molder because he uses only one flask in many sizes. It will save money for the manufacturer, as one size of our flask will answer the same purpose as several different sizes of the old style. The inventor is a practical molder and in constructing this flask has not destroyed the good features of any others, but has added many new ones. A three part flask is made to adjust the same as a two part.

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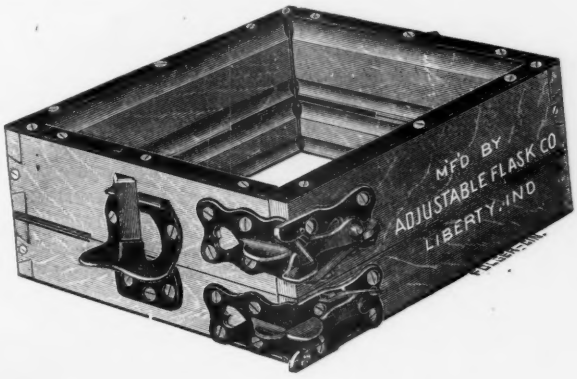

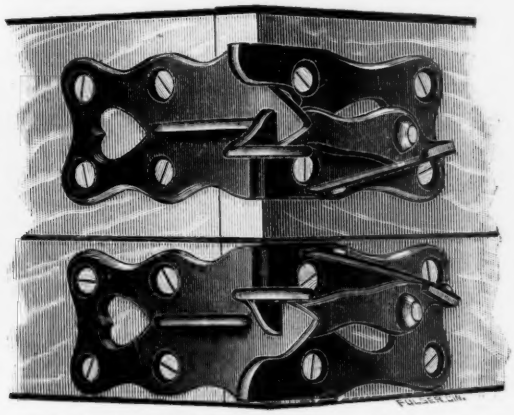

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Our new Automatic Latch is made of malleable iron and flat steel oil tempered spring. There is no coil spring to get out of order; When flask is closed the latch makes a solid locked corner. The latch is put on cope and drag in such manner that by pulling latches together with finger and thumb of one hand, the flask opens freely.

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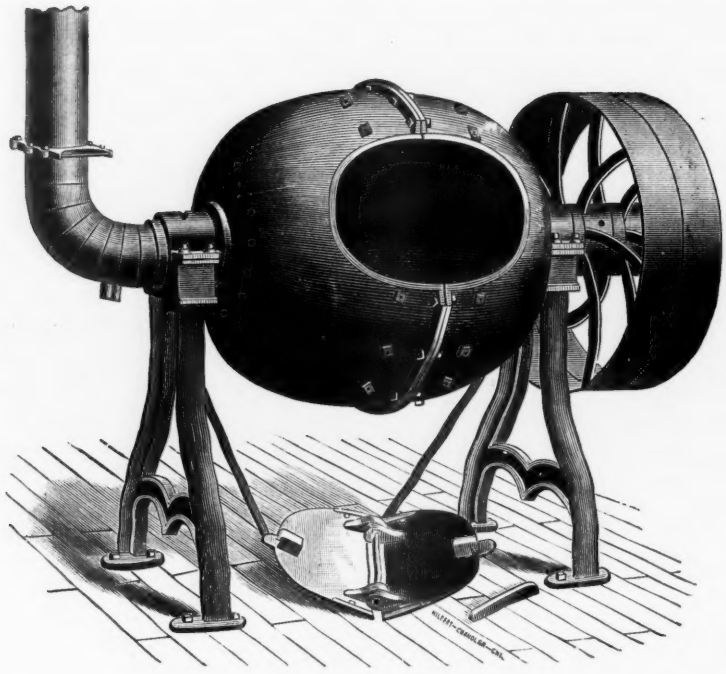

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Sent on 30 days approval to any responsible manufacturer of light castings, malleable iron, wire nails, or any other small articles that require cleaning and polishing.

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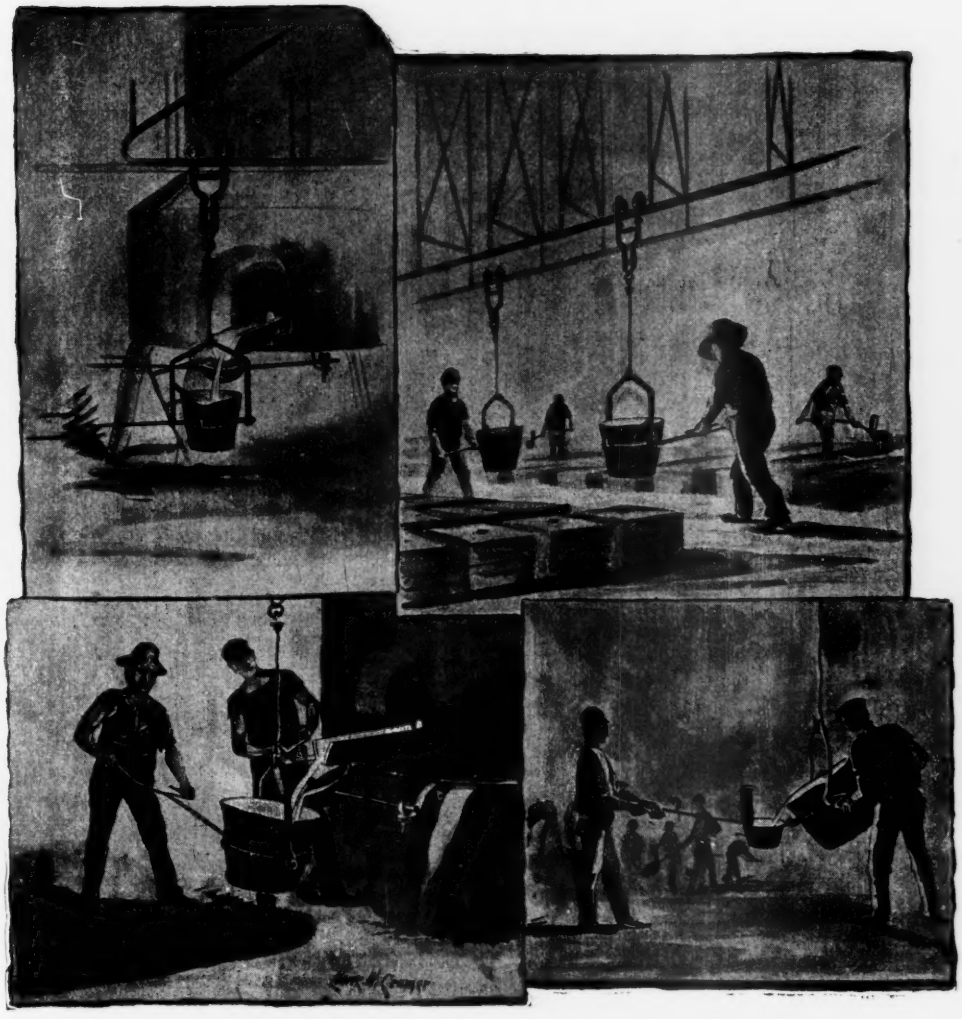

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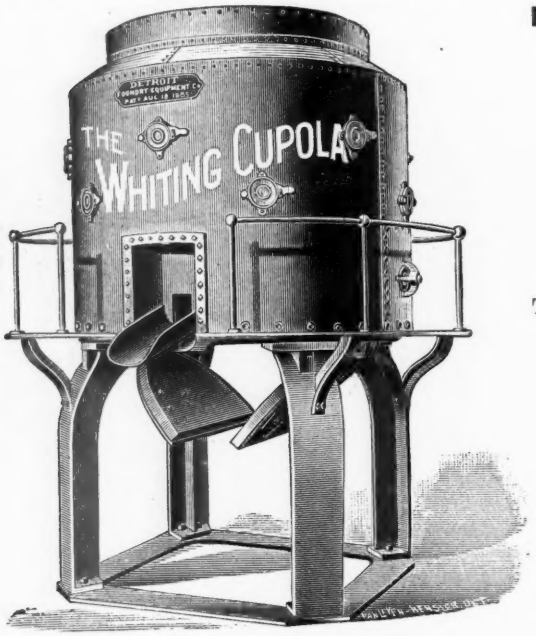

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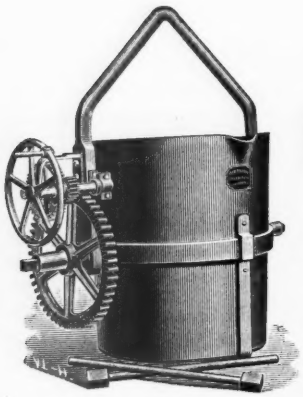

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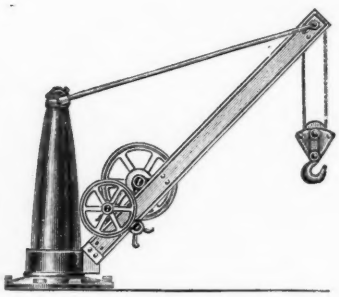

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THE FOUNDRY

VOL. 2. DETROIT, MICH., MAY, 1893. No. 9.

TECHNICAL EDUCATION FOR THE MOLDDR.

SECOND PAPER—BY S. BOLLAND.

THE Reverberatory furnace need not be of greater capacity than is absolutely necessary for demonstrating its use for the purpose of melting cast-iron and brass. The different principles of melting in direct contact with the fuel, as in the cupola, and of melting by exposing the metal to the action of the flame, as in the reverberatory, could be effectively illustrated and explained by actual practice. Subsequent tests, chemical and physical, would reveal differences caused by the two methods of melting, as well as furnish practice and experience in a branch of the business which has for some time been considerably undervalued and neglected.

Crucible melting for brass, cast-iron and steel should be taught thoroughly. For brass, an ordinary air furnace of the common type should be provided, in order to clearly demonstrate the different modes of melting with a natural draught and a forced one, the latter being the style of furnace to be provided for melting cast iron and steel. The common brass furnace with natural draught may be converted into a blast furnace suitable for melting cast-iron or steel in crucibles, by simply making the ash pit door air-tight, and introducing the blast therein at a pressure of about three ounces. These would serve to illustrate the ordinary class of crucible melting, but they should be supplemented by a regenerating furnace of the latest type, suitable for exhibiting the improved methods of obtaining extreme heats from inferior fuels, etc. The uses to which the crucible can be put for experimental purposes are too numerous to mention here, and no instructor who understands this thoroughly will fail to make good use of the opportunities they offer.

If molding is to be taught in the technical school, castings must be made undoubtedly, of such kind and dimensions as will best serve to bring out distinctly all the underlying principles which govern the art. Objections are made to this view of the matter, on the ground of expense principally, but this should not be allowed to prevail if we are earnest in our desires to see this great object succeed. Here again we notice that no complaint reaches the surface, on that score, about any other department than the foundry; it cannot be that the objectors are so ignorant of affairs as to think the business of founding of minor importance in the great iron industries; every day furnishes evidence conclusive that the foundry ranks as high, if not higher, than any other department in importance and that under intelligent and skillful direction they may be made even more valuable than has yet been dreamed of.

Allow the foundry instruction in these schools to occupy the position it is justly entitled to, and we shall not be long in discovering that our fears were without foundation. Our young men will immediately avail themselves of the opportunities offered for obtaining information beyond that afforded in the daily routine of the shop; they will flock to the night schools, because, owing to the diversified exercises chosen, there will always be something novel and instructive to attract the attention and secure their steady attendance upon the studies enforced.

Suitable objects for the purpose of illustrating the methods of molding in

loam, green sand, dry sand and core-making of all descriptions could be readily obtained from the neighboring manufactories and city works, of castings of a duplicate character in constant demand. Drawings could be furnished by said firms to which patterns, core-boxes and sweeps could be made by the students in that branch under direction of their own instructor, aided by the instructor of founding. The patterns would furnish admirable practice of a genuine kind and when complete would be molded from, in the foundry. The castings could then be bored, turned or milled in the machine department to drawings supplied and afterwards delivered and paid for in the regular way of trade, thus furnishing servicable practice to several branches of students as well as being a source of revenue to the institution.

Take, for instance, an ordinary sewer head for the city, for which castings there is always a steady demand. These castings could be made very servicable as examples for illustration, a suitable set of flasks should be made to mold it in green sand, vertically, the core to be made in the pattern used. The same pattern could be also used as an example of bedding in, using a cope only to cover with. Another pattern could be made in halves for the same casting with flasks to suit for casting horizontally; in this case a dry sand core could be used, also a green sand one on a horizontal arbor. Lastly the center spindle and sweep boards could be brought into requisition for molding this casting, exclusive of pattern or flasks, forming both the outer and inner surfaces with bricks and loam.

The above described examples, simple as they seem, afford scope for a considerable amount of ingenuity and almost every branch of the molder's art is called into practice to produce these castings in the several ways described.

The instructor should be qualified to teach all the branches of molding enumerated above, and most assuredly his sins will find him out if he is in any sense deficient, there being no one hand able to furnish the talent wherewith to cover his own short-comings, something of altogether too frequent occurance in the foundries.

The importance of having men of ability and judgment as instructors will be apparent, even to the uninitiated, when they consider that all the necessary tools and their appurtenances requisite for these dissimilar operations must be devised by him in such variety and design as will not only answer present needs, but serve also as standard models of their kind, to be used for the purpose of illustration when it is desired to inculcate high class methods of construction in the minds of the students.

Another very suitable object which might be chosen as a study in all the branches of molding is a 24-inch steam cylinder to be obtained from one of the large pump and engine works. This casting, in addition to the opportunities presented for molding under altered circumstances, offers the further inducement that subsequent boring and finishing in the machine department would reveal at once any imperfections arising from either faulty molds or unsuitable iron. The construction of such a mold entirely in green sand, to be cast horizontally, would call forth some very excellent practice in the arrangements for pouring, in order to obtain clean castings in the bore, also to practically demonstrate the greater nicety and more delicate workmanship displayed in producing castings this way than is required for the same job in dry sand.

The latter useful and effective style of molding can be very ably illustrated by such a cylinder. Different modes of finishing and closing, in fact, all the chief operations demanded for dry sand work of greater magnitude may by this one illustration be made exceedingly plain.

As in dry sand, so in loam; the requisite equipment for the production of such a casting, in loam, could be made so as to represent a fac-simile of that required for molding the largest cylinders made for the government cruisers.

Firms making a specialty of ship propellers would be willing to accept castings produced at these institutions at their market value; consequently, this very interesting and highly instruc-

tive phase of the molders art could be learned more thoroughly in the school than in the foundry. The sizes chosen for this purpose might range from 2 ft. to 5 ft. diameter with varying pitches to accommodate the obliging firm, who would regulate them according to the stock generally carried. Here again we have unmistakeably good practice for pattern-making department in providing the necessary molding boxes with the single-wing attachment, for molding small wheels in green sand, sectionally, a method which exacts the nicest manipulation and requires considerable practice before perfection is attained. For casting wheels in dry sand the instructor would teach how to construct the requisite sets of flasks for molding from a fixed spindle and one wing at a time in flasks secured to a foundation plate using separate copes for the upper side of the blade. Practice of this class developes the constructive faculties and expands the mind beyond the limits of an ordinary molder's career.

The larger wheels would make good examples for loam work, for, in addition to the practice afforded in manipulating molds with the spindle and sweep board, the right use of the angle board could be effectively explained. A 5-foot wheel would be large enough for a practical illustration of every principle involved in producing one 15 foot diameter by the same method.

The value of these instructions in propeller molding would be considerably enhanced by procuring an old casting about 3 feet 6 inches diameter, from which to mold one occasionally in green sand; by bedding in the sand with the upper tips of the blades level with the floor, forming the joints at each blade, and lifting out the hanging sand with lifters hooked on the bars of an ordinary four-foot square flat cope; this is a very useful class of experience and very much needed almost everywhere.

The above described methods of molding propeller wheels serve as excellent illustrations of the several modes of molding of which they are representative, the first being a specimen of sectional molding applicable to work other than wheels; the second shows how the center spindle may become of almost universal use in producing certain classes of castings from a simple section of the whole pattern, commonly provided. The angle board used for forming the blade in loam is a study in itself. Since its introduction for the above purpose, very many similar objects are thus formed by the molder, and considerable pattern-making saved as well as cost for the mechanical contrivances formerly used. Grooved drums, formerly molded in loam by revolving two or three grooves from top to bottom of the outside cope by means of a central threaded spindle are now formed by one revolution of a full length sweep board traveling on a guide corresponding to one turn of the thread desired.

A 12-inch ordinary socket pipe 10 feet long, such as are used for city purposes, could without difficulty be obtained. By molding these in the several ways to be described considerable knowledge of an extraordinary kind is to be gained. By preparing a set of cylindrical flasks or casings, made purposely in three sections lengthwise, the whole system of molding extra long hydraulic cylinders and rams, guns, etc., may be conveniently explained. Opportunities are here presented for a nice adjustment of the sections by such effective means as will iusure a true vertical mold free of seams when all are closed together. Some very good practice may be introduced here and along with many other schemes for obtaining the mold in these flasks let a short plug be drawn through all the sections together and separate, forming the head and socket with loose pieces or in any other way which the ingenuity of the instructor may suggest. This would, of course, be a dry sand mold and must have a loam core struck on a barrel made for the occasion, a class of core-making too little practiced outside of the pipe foundries now-a-days. Thii mold, when dried and closed, must be cast vertically.

Another way is to make a full pattern in halves, with a half core-box and sweep for striking off the upper side of core. In this case half flasks should be used for molding in green sand and cast-

ing horizontally; the core to be formed in the aforesaid box on a full length cast arbor in green sand also. This will furnish excellent practice in another class of core-making too long neglected.

The same flasks must be fitted at the ends with parallels and bearings for carrying a center spindle horizontally with which to sweep out each half of the mold in plastic material, exclusive of the pattern. The cores in this instance may be made in dry sand halves and jointed to vary the practice somewhat. As this mold is prepared for drying, it may be cast alternately in a horizontal and vertical position, the latter method calling for some special arrangement for hoisting into a vertical position and lowering in the pit, as well as serving to illustrate the different modes of gateing and securing the core.

Some suitable specimens of hollow-ware should also be introduced into these schools. There are thousands of molders who are to-day as ignorant of the processes connected with this kind of molding as were the Dutchmen who failed in making the first pot at Coalbrookdale in the year 1709. The flasks used for this purpose are ingenious and suggestive and the very neat manipulations of the practiced hollow-ware molder are of a kind calculated to infuse new life into the somewhat slow and slip-shod ways of the ordinary workman who attempts to make this particular class of work.

The eye and hand of the ambitious loam molder might receive training of a high order by assiduous practice on some object similiar to a Y pipe or any other analogous surface of ever varying dimensions and constant change of curve; something possessing a surface impossible to form only by the hand assisted somewhat by gauges and templates. Exercises of a similar kind may be given on green sand surfaces by the use of forming strips and sweeps with a final smoothing over of the tools. These exercises need not necessarily be practiced on dumb molds, the more advanced could be taught to form surfaces corresponding to sketches given such surfaces to receive the treatment necessary for the purpose of casting metal thereon.

The changes lately brought about by the introduction of a profuse display of fine art work in modern buildings, most of which it is now desired to produce in cast iron has created a demand for molders with some experience in such work, and because these castings have hitherto been chiefly cast in other metals than cast-iron it has been found difficult to supply this demand for the simple reason that fine art work in cast-iron requires to be made in material to which the ordinary worker in bronze and other alloys are unaccustomed. There is no doubt but this demand will continue and it would be well that the subject received immediate attention in the technical schools where special classes could be taught the entire process of statue figure founding, including the *cire perdue* and other modes of procedure connected with taking casts in metal and plaster, confining the study as near as possible, to such classes of work as would be likely to find its way into our iron and brass foundries.

It will be very evident to all who are at all interested in foundry instruction at the technical schools, that no institution of the kind should be without a modern molding machine of acknowledged merit. This is a comparatively new study and is claiming the attention of founders more to-day than it has ever done in the past, simply because there has been a nearer approach made to hand manipulation by the introduction of devices which have for their object the correct ramming of the molds within the flasks. Some of these devices are automatic and trustworthy and the quantity as well as quality of work accomplished in a given time bears unmistakable evidence to the justice of their claims to universal recognition and adoption wherever large numbers of duplicate castings of a certain kind are in active demand.

A good machine with stripping plate attachment would be a valuable acquisition to the school, the minds of the students could be exercised in discovering methods for overcoming difficulties presented when the joining surfaces are irregular and in framing schemes for automatically delivering such projec-

tions as are oblique to the general surfaces of the pattern.

It is safe to say that no school of technology has been more successful than the Stevens Institute, from which place have been graduated a large number of engineers whose acknowledged ability has fully proved what can be done when competent instructors and judicious management are allowed full scope. Is it too much to ask that the molder be allowed similar opportunities for distinguishing himself?

SHRINKAGE AND WARPING OF CASTINGS.

IT is quite unnecessary to state what every machinist is aware of, that one of the difficulties which he has to contend with arises from warped and crooked castings. The molder is often blamed for what it is impossible for him to avoid under certain conditions; and, while it is a fact that in some cases warped castings are the result of carelessness and neglect, yet still cases frequently do occur where the most careful and skillful molder who has taken every precaution possible will be annoyed and disappointed to find some of the castings he has made so warped and distorted as to be unfit for use. Now, while it is important and even absolutely necessary that the molder should be able to judge from the shape and style of the pattern whether the casting made from it will be liable to warp while cooling, he may in many cases, by taking the proper precautions, both in the molding and in the cooling after the casting is poured, that a fairly straight and true casting may be had from a pattern not so well proportioned as it should be, while, without such precaution, in all probability it would come out of the sand so warped and otherwise distorted as to render it unfit for use. But, notwithstanding all the precaution on the part of the molder, patterns in many cases are so constructed that it is next to an impossibility to obtain a straight casting from them under any conditions; this is especially the case with many of the frames for heavy machinery. With such frames or patterns the fault is with the designer or pattern-maker. In designing the necessary patterns for machinery while it is important to obtain the greatest amount of strength with the least amount of material, still he should never lose sight of the fact that even if he can obtain the greatest strength in a frame with a light plate and heavy, wide ribs; still, if the unequal shrinkage will be such as to so distort the casting that it will either be spoiled or require double the time in the machide shop to plane it or otherwise fit it up, the lost time, together with the loss in material, will in most cases more than equal the saving of material in the pattern, and for this reason the careful and experienced designer will study these points and find that it is sometimes necessary to put more material in certain parts of a pattern than is really required for actual strength in order to provide against the unequal shrinkage of those parts of the same pattern that require more strength. Cast iron, as well as all other metals, expands with heat, and consequently contracts in cooling; and, when all parts of a casting can be equally cooled, there will be an equal shrinkage in all parts, and consequently no tendency to warp. Sometimes this tendency for unequal shrinkage in castings, where some parts of the pattern are heavier than others, may be partially counteracted by removing the sand from the heavier portions as soon as practical after the casting is poured; and, by thus exposing them to the air, while the lighter portions remain embedded in the sand, the cooling process is more equalized, and less liability for warping is usually the result. But even then, if good judgment is not manifested in this respect, and the cooling of the heavier parts properly regulated, the casting is liable to be warped in the opposite direction. But the skillful molder, where the difference in thickness of the casting is not too great, and where the heavier parts are so that they may be had access to, will generally regulate the cooling process so that a fairly straight and perfect casting may be obtained. But, in all heavy castings, it is far more safe to make all the parts of the pattern as near the same thickness as possible, even if it has to

be done at the sacrifice of a certain amount of iron. With pulleys and gearing, however, the case is somewhat different, and it is not practical always to put the same thickness of metal into the arms and rim as in the hub. Where the arms and rim contain about the same quantity of metal, neither will be materially affected by shrinkage; but, where the hub is heavy, the rim and arms are liable to cool faster and become set while the hub yet remains soft and in a semi-liquid state; and, in cooling, the shrinkage is liable to separate it from the arms. This is more liable to be the case where the arms are straight than with those which are curved. Various methods are resorted to by pattern-makers to counteract this tendency, one of which is to make the arms in the shape of a curve so that the shrinkage of the hub may be compensated for by slightly straightening the arms. Another method is to use what is known among foundrymen as a recess core; that is, a core made larger in the center than at the ends, so that while a sufficient thickness of metal is left at each end to support the pulley upon the shaft, the center of the hub is reduced to a shell of only sufficient thickness to support the arms and give it sufficient strength. Where no provision is made by the pattern-maker the molder must provide means of his own to prevent the loss of the casting by unequal shrinkage. One of the most common is to uncover the hub as soon as the iron is sufficiently set to admit of it, and remove as much of the core as possible so as to give the air a free circulation and access to all parts of it; and, where the hub is small as compared to the casting, this precaution is all that is necessary, but with light pulleys with large hubs this is not always sufficient, and water is often poured into the center of the hub to hasten the cooling process. Now, while this practice may be successful so far as the molder is concerned, it is not always so for the machinist; for, in many cases, the hubs are rendered so hard that it is impossible to bore them in a proper manner, and the machinist's tools, especially the reamers, are frequently spoiled in consequence. While straight-arm pulleys and gears are now the prevailing style, and may be more pleasing to the eye, still, there can be no question that, with all the care on the part of both pattern-maker and molder, there is more strain upon a straight arm and it is more liable to be broken than one with arms in the shape of a curve, allowing each to contain the same amount of metal. This fact may be verified by observing those large pulleys or gears that have been through a fire, and while the heat to which they have been subjected may be comparatively slight, and those pulleys or gears with curved arms will be found to have sustained little if any damage, those with straight arms, under the same conditions, will in a large majority of cases be found cracked or pulled away from the hub or rim, or if not entirely separated from the rim, there will be found a flat spot over each arm so as to render the pulley useless for future use; and, from extensive observation, it is safe to say that where a lot of pulleys pass through a moderate fire, and part of them are straight and part curved, that those with curved arms will be found not materially damaged while at least five out of every ten with straight arms will be entirely useless. Therefore, under ordinary conditions, no matter what the style may be, pulleys with curved arms are the safest.—*Mechanical News.*

PATTERNS.

EVERY foundryman is interested in the subject of patterns. They are an essential in his business, without them he can do nothing and we regret to say with some of them he can do nothing or next to nothing.

In these days of fierce competition it becomes more and more apparent day by day that there must be little or no waste in any department and as few losses as possible to insure a profit, and in no part of any manufacturing industry is more care required and loss harder to guard against, than in the foundry.

To have patterns made perfectly so that they will leave the sand freely and as squarely as possible and avoid, in the case of machinery work, tedious patch-

ing at molds which never equal in appearance, finish or shape, the work of the perfect pattern and in the case of stove and finer patterns to have them made by men who have become adepts at that class of work from years of experience and whose patterns can not only be put together in the pattern shop but the castings made from them will readily lift, draw, and remain so true and straight that the mounter's work is reduced to a minimum and the percentage of bad castings charged against the molder is but a fraction of what it sometimes is when this care is not taken.

To bring about results in this direction is something, as we said all are interested in, from proprietors to the machinist, mounter, finisher and molder, the latter especially, as in many cases he is working by the piece and imperfections in his work are attributed to him instead of the pattern-maker. These thoughts have been suggested to us from the knowledge we have recently acquired of the amount of work that is being done by some of the large pattern-making establishments in the country and the reasons which have doubtless led to their establishment and success.

Prominent among these, and indeed, we believe the largest is the Gobeille Pattern Company, Cleveland, Ohio, who are just about to increase their capacity by the addition of a third building to their already extensive works which our artist has secured a view and we illustrate herewith. It was established in 1881. Jos. Leon Gobeille who, though yet quite a young man "served his time," worked at the bench as a journeyman, became draftsman, then foreman, finally starting on his own account. They now employ over 100 men and will start No. 3 works with 50 additional. The buildings are separated to ensure light all round and in case of fire only one would in all probability be disabled, many of the tools used are specially designed and built by the company and used nowhere else.

The work is all specialized, that is divided into classes and given to those who make a specialty of that particular kind and good results are further insured by having all patterns worked out on the group system, that is one person doing one thing to it, another another thing, etc. It is said that there has never been a strike, lay-off or cut in wages since the founding of the company and some of the best pattern-makers in the country have graduated from their works. Mr. E. H. Diehle, General Secretary of the Pattern Makers National League, being among the number.

MAKING RIFLED MORTARS.

A REPRESENTATIVE of THE FOUNDRY recently enjoyed the pleasure of going through the establishment of the Builders' Iron Foundry, Providence, R. I., and was much interested with what he saw there, as it is a well known establishment we might almost say of national importance since they have been for many months employing a portion of their force in completing an order which has been placed with them by the United States Government for 73 guns of the type that are officially termed "12-inch breech loading rifled mortars, cast iron body, steel hooped 14¼ tons." Several of these were seen in various stages of construction, from the making of the molds in the foundry to the placing upon them of the finishing touches in the machine shop.

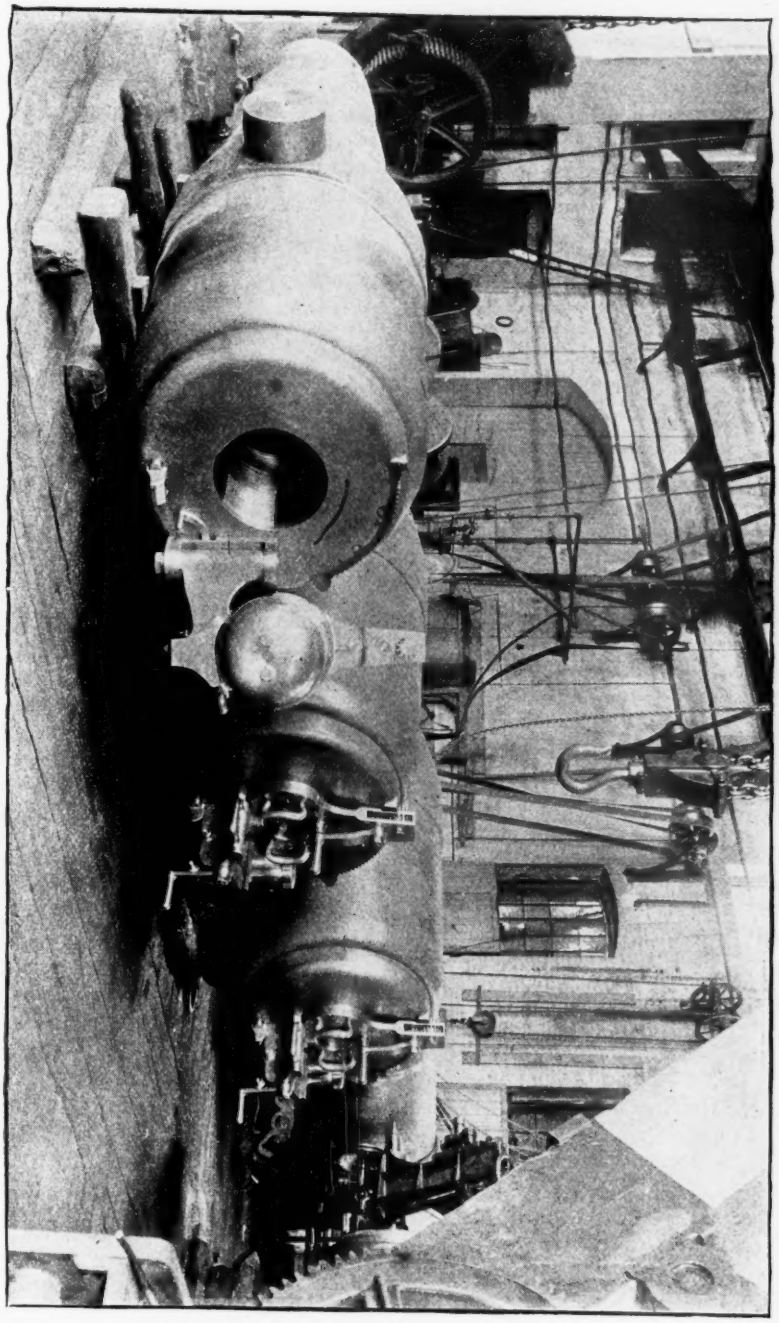
The mortars in appearance very closely resemble the steel breechloading rifles made by the United States Navy Department, with the exception of their length, which, in the rifles is about thirty times the diameter of the bore, and in the mortars only ten times. The cast-iron bodies have a 12″ bore, are 129″ long and 31½″ diameter, and the diameter over the steel hoops, which are shrunk on the bodies in two rows, is 42⅓″.

The specifications in the contract call for the casting for the bodies to be made from charcoal pig and to be cast vertically, breech downward, to be cooled by the circulation of water through the core, according to the Rodman process. Test specimens cut from both muzzle and breech ends of the mortar to have an elastic limit of about 17,000 pounds and a tensile strength between 30,000 and 37,000 pounds per square inch, or nearly double the strength of ordinary cast-iron; one-fifth of the entire casting to be cut off for a shrink or sinking head. The metal is also tested for specific gravity and hardness, the latter is a specific test and is made by forcing a standard steel pyramid into the metal and noting the depth to which it sinks under a given pressure. The molds are, of course, the least difficult part of the work. They are made in segments of dry sand of about 30 inches each and bolted together, and resemble, as far as outside appearance is concerned, a round mold about 15 feet long and 20 inches in diameter into which is inserted a loam core. Each segment is rammed up in a section of cast iron flask, made on purpose, that leaves about 6 inches of sand all round the casting. The gun when finished has, of course, quite a taper from the size at breech to that at the muzzle but when cast is quite parallel. The extra large amount of cast iron being left on to provide amply for shrinkage. The Rodman process spoken of consists in keeping the core cool by circulating water in the core barrel. The water is introduced through a 1½ inch gas pipe conducted directly to the bottom of the barrel; the overflow taking place through a similar pipe leading from the top of the barrel, about 10 gallons per hour, being forced through or just enough to keep it at about 120 degrees.

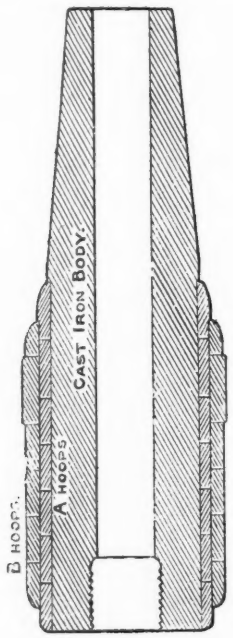
The metal is melted in an air furnace and the iron, being separated from the fuel, is more uniform and homogeneous, and the results more reliable than could be obtained with the ordinary cupola. About six hours are required to completely melt it and from two to six hours longer to bring the metal to the proper state before pouring. The amount of coal consumed is about 14,000 pounds or 37 per cent of the weight of metal, which is nearly four times the amount of fuel required by an ordinary cupola.

The iron being tapped off, flows through a long runner of fire clay directly from the furnace into the mold. As soon as the piece is cast, water is kept constantly circulating through the core and the cooling at once commences. The top of the casting is covered with charcoal and a charcoal fire is built in the pit around the outside of the iron flask to keep the exterior from cooling too rapidly. In about twenty-four hours the core is removed and the water turned directly into bore of the casting for a day or two longer. The castings are made at the rate of one a week.

The casting is next placed in a gun lathe, which is of heavy build with a long-boring bar attachment instead of a tail-stock. The gun is



held and driven by a large chuck on the face plate and the other end of the casting runs in a semi-circular bearing or steady rest. The boring bar has no rotary movement but is fed towards the face-plate and carries a reamer-like cutter-head which enlarges the hole by several cuts to 11.8 inches. Meanwhile ordinary turning tools are turning down the chase or forward taper and parting off the test discs and shrink head. The parting tools are run in nearly to the bore, the gun body is moved from the lathe and the discs broken from the casting by wedge and sledge. The hold is next enlarged to within .1 inch of the final diameter. The steel hoops preparatory to shrinkage are faced at the ends and bored to 31.5 inches



diameter, .003 being the allowed variation from exact size.

The outside of the body is now accurately turned to a varying diameter slightly larger than the inside of the hoops to be shrunk thereon. This difference is called the "shrinkage" and it varies along the entire length to be hooped under nearly equal tension. As might be supposed, the diameter of the bore is slightly increased when the hoops are shrunk on.

Air and city gas are mixed in about the proportions of three to one by an injector and the flames play directly against the hoop, both inside and out, and heat it to about 500° Fahr., or to a point where a certain minimum gauge .015 inch larger, the total expansion being about .09 inch in a hoop. When heated, the hoop is slipped over the gun and up to its proper place, when, by means of the hooping press, a force of 100 tons is exerted to make a tight joint between it and the one immediately in front. A plane of water from a "sprinkling ring" is then allowed to play on the forward portion of the hoop, which soon contracts enough to grip the body. The plane of water is then moved slowly backward until entire hoop is cold. The reader can see the necessity of cooling and hence clamping forward portion before the rest, for otherwise the contraction ensuing would open up the joint, notwithstanding all the pressure that could be applied. The closeness of these joints may be inferred from the fact that after the exterior is turned they can seldom be detected. The exterior of the first row, or "A" hoops, is now turned down as carefully as was the body, the "B" or second row of hoops shrunk on it in a similar manner and the entire exterior is turned to the finishing diameters. The hoops are so placed as to break joints.

The next step in construction is the fine boring which must be between 12,000 and 12,003 inches in diameter and straight enough to allow a test cylinder 11,997 inches diameter and 42 inches long to easily slip through the entire length of the bore of the gun.

Next comes the rifling. Few operations in machine-shop practice require as much care as in the rifling of a cannon, since so much is at stake. There is no part of the most expensive steam engine but can be replaced in case of an accident during the manufacture, but here the results of months of labor may be entirely spoiled by a false cut. The body would be ruined and the steel hoops encircling it would be worthless. The necessity for extra care both in the design and operation of the rifling machine is apparent. Extra care is en-

joined upon the operator, and mechanical contrivances are provided for instantly stopping the machinery if any detail gets out of enlignment sixty-eight (68) grooves are out .379 inches wide and .07 inches deep, and these grooves have an "increase pitch" varying from one turn in 25 caliber to one in 40, the object being to avoid a too sudden initial totation of the shot when fired. The next operation is the threading which is done with a special machine.

In these mortars about 80 pounds of powder will produce an initial pressure of some 28,000 pounds per square inch, and give a muzzle velocity of 1,200 feet per second to a shell of 830 pounds. This will insure a range of about six miles at 45° elevation. This shell or hollow steel shot contains about 30 pounds of fine powder. Its front end is turned to a curve called the "ogival" which form offers the least resistence to the air, and its back end contains a soft metal collar, which, when forced into a rifling groove, gives it the required rotary motion. The ingenious primer which fires the explosive in the shell is also placed at the back end of the shell. It does not move from its place when the shot is fired, but is projected forward against a fulminating cap when an object is struck. These mortars are mounted on carriages very similar to cannon carriages, except that the recoil takes place 50° from, instead of in the horizontal plane. It is proposed to distribute them along our seaboard in groups of 16 to have them shielded from the enemy's ships by high earth embankments and to fire them simultaneously by means of electricity.

Our illustration shows a group of four of these mounters as they appeared in the machine shop three of them being finished, while Fig 2 shows a longitudinal sectional view that will enable the readers to better understand the process of finishing from the preceding description.

Before closing this article we feel it our duty to make especial mention of something which renders our visit to this establishment noteworthy, and that was the effort made by those connected with it to show every courtesy to visitors who are extended an invitation to pay any of the extensive departments connected therewith a visit and have every detail of the work explained to them in the most courteous manner. This we are pleased to say is in sharp contrast with the un-American policy adopted by many of our manufacturing concerns who endeavor to render their shops as much like a penal institution as possible. We have one large and well known place especially in mind, where a pompous blue-coated official has to be passed before admission can be obtained, even to the office, while visitors of any kind to the works are almost entirely tabooed and where an employee would be promptly discharged if for any reason he was found in any other department than his own, a molder not being allowed to enter the sacred precincts of the machine shop or a machinist to violate the sanctity of the pattern room, a system of espionage being kept on every man's movements that causes him to feel the reverse of interested in his employers prosperity and engenders a feeling of hostility that will never be productive of the good feeling that it pays to have exist between employee and employer.

REDUCING FRICTION BY MEANS OF PURE FLAKE GRAPHITE.

FOR several months past an advertisement has appeared in the leading mechanical papers offerings to send free of charge a pamphlet describing the nature and peculiarities of graphite, with scientific opinions as to its value as a lubricant, and experiences of practical engineers and machinists.

The result is, there are hundreds, if not thousands, of wide-awake and progressive people who have a far better idea to-day as to the value of pure flake graphite for reducing friction in working parts of engines and machinery, and for lessening wear and tear and breakage in joints, gaskets, bolts, etc.

Graphite is commonly known as blacklead, but there is a wide difference in the material, as well as in its preparation for lubricating purposes, and a great deal of the stuff offered is worse than useless. It is for this reason that every

one who has any use for a lubricant, and especially one that is possessed of such peculiar properties, should avail himself of an opportunity to see a sample and learn of its many uses. Such an opportunity is presented by the Joseph Dixon Crucible Co., Jersey City, N. J., who now not only offer to send their valuable pamphlet, but will also send sample of Dixon's pure Ticonderoga flake Graphite free of charge.

REFRESHING HIS MEMORY.

CHICAGO bridegroom — Were you ever married before, love?

Chicago bride—Why, yes; I was married to you in the fall of 1888.

Chicago bridegroom—I thought there was somethihg familiar about you.—*Judge.*

TWO NEW CRANES.

WM. SELLERS & CO., Philadelphia, Pa., have recently made two mammoth traveling cranes for the foundry of the Robinson & Rea M'f'g. Co., Pittsburgh, Pa., both of these cranes had a span of 80 ft., one being 30 ton and the other 60 ton capacity and were both provided with the double trolley which has been a distinctive feature in many of the cranes manufactured by this well known company and which enables their cranes to be engaged in two separate pieces of work at once, or both trolleys can be used together, a valuable feature where heavy work is kone.

The article appearing in the March number of THE FOUNDRY illustrating a pattern-drawing device, should have informed our readers that it was made by Wilson & Travers, Baltimore, Md., whose advertisement appears elsewhere.

SPEAKING OF STOVES.

"CURIOUS thing about a stove," observed the exchange editor of the Chicago Tribune, as he came in, shivering, took off his coat, hung it on its accustomed peg, sat down, examined the points of his shears to see if they could be depended upon in a sudden emergency, and glancing furtively over his shoulder at the financial editor, "curious thing about a stove is that it is always hottest when it's coaled."

"Chestnut!—coal," remarked the financial editor, slowly; "it's a great deal more"——

"Now, don't get out of your range," interposed the exchange editor.

"If I should," retorted the other, "you couldn't furnace me with any ideas on the subject!"

"But you might get stove up."

"You think you're a pretty large egg, don't you?"

"I don't want any of your slack, anyhow," said the exchange editor, breathing hard.

"If it doesn't soot you," snorted the man of finance, "you can lump it!"

"You needn't get so warm over it!"

"Then don't stir me up."

"I haven't bin stirring you up."

"It's mighty hod if you haven't."

"Such a remark as that coming from a man who is always getting scooped"—

"Or from a man who can't hold a cannel to"———

But here the railroad editor hastily interposed.

"Gentlemen," he said, "not another word, by chim'ney."

THE FIRE FIEND.

The Chicago Ornamental Iron Works suffered considerable damage from fire April 22nd. The building was brick and stone, costing $20,000 and though it only suffered $5,000 worth of damage, yet the loss it is said will amount to $50,000 in valuable patterns, including original ones in plaster and wood for World's Fair work and other Chicago buildings.

The foundry of Chas. D. Force & Co., Morriston, N. J., suffered $500 damage by fire April 4th.

The foundry of the Champion Iron Co., Kenton, O., was burned April 18th. Loss $20,000, fully insured.

The pattern house of Geo. R. Lombard & Co., foundrymen at Agusta, Ga., has been burned. Loss $15,000.

THE FOUNDRY

A TECHNICAL JOURNAL DEVOTED TO FOUNDRY INTERESTS.

Published Monthly by

"The Foundry Publishing Co."

172 Griswold St. DETROIT, MICH.

DETROIT, MAY 10TH, 1893.

Entered at the Post Office at Detroit, Mich., as second-class matter.

SUBSCRIPTION—One Dollar and fifty cents per year in advance in United States, Canada or Mexico; one dollar and seventy-five cents per year to all other countries. May be sent by express, draft, money order, registered letter or postage stamps. Single copies, 15c

CLUB RATES—Eight or more subscriptions sent at one time, $1.25 per year each. Cash to accompany order.

Advertising rates furnished upon application.

SUBSCRIBERS can have address changed as often as desired.

IF YOU FAIL to receive your paper promptly, please notify us.

THE FOUNDRY is issued promptly on the tenth of each month, and will spare no endeavor to furnish valuable news and information to those interested professionally or incidentally in molding, melting, mixing of metals, foundry management, etc. Persons connected with any of these lines of industry will confer a favor upon the Editor of this Journal by sending him news from their section of the country pertaining to the foundry interests, particularly individual theories and experiences of practical value.

The Detroit News Company,

Publishers' Agents, Detroit, Mich.

DEALERS SUPPLIED BY

The Albany News Company, Albany, N. Y.
The Baltimore NewsCompany, Baltimore, Md.
The Brooklyn News Company, N. Y.
The Buffalo News Company, Buffalo, N. Y.
The Central News Company, Philadelphia, Pa.
The Cincinnati News Company, Cincinnati, Ohio.
The Cleveland News Company, Cleveland, Ohio.
The Colorado News Company, Denver Colorado.
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The San Francisco News Company, San Francisco, Cal.
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The Toronto News Company, Toronto, Ontario, Canada.
The Washington News Company, Washington, D. C.
The Western News Company, Chicago, Ill
The Williamsburg News Company, Brooklyn, E. D., N.Y.
The Wisconsin News Company, Milwaukee, Wis.

TO WHOM WE APOLOGIZE.

THE FOUNDRY desires to offer an apology for the amount of space devoted this month to the ventilating of a little difference which has arisen between it and the Hartsfeld Furnace & Refining Company, (although what furnace they build or operate or just exactly what they refine is something we know nothing of). Our only excuse is that this paper is published in the interest of the foundry business and we deemed it our duty when we received a half-page advertisement from this concern unsolicited, to refuse it, first because we did not believe that they were a reliable concern, and second because we believed the alloy to be a "fake" and in order to prevent our friends from being imposed upon likewise. We gave these people, some publicity which they claim has injured their business, but we have not heard that it has injured any of America's foundrymen in whose interest this paper is published, and if any apology is to be made by us, it is to those who may look to see some more worthy subject discussed in these columns and not to the company under discussion.

PUT YOURSELF IN HIS PLACE.

WE have read with very great interest always the accounts of the proceedings of the Philadelphia Foundrymen's Association and hitherto have had nothing but praise for the good work they were very evidently doing and applause for all those who were unselfishly, in most cases, giving their time and attention to the advancement of its interests.

We notice, however, in the proceedings of their meeting of April 5th, mention of a subject that it seems to us would work an injustice if carried out. By reference to the report of that meeting it will be seen that one of the gentlemen present referred to the desirability of making all pay days a month apart, and while we are not thoroughly well informed as to the existing practice, it seems to us that it would actually pay the majority of proprietors were they to arrange for, at least, a fortnightly pay day.

The claim is, of course, made that in small establishments this can be conveniently done, but that in large ones, employing a hundred or perhaps a thousand men, it becomes very cumbersome, and requires an expenditure of time and labor that costs in the aggregate considerable.

Such an apology can be answered by the

statement, that it costs more per man to make out pay rolls and pay off 100 men than it does 1,000.

We all know that the wageworker receives but a small sum after all for his labor, and no one knows better than the manufacturer the value of ready cash, and that a dollar is often worth more than its face value. The same rule applies only in an increased ratio with the poor man, who must needs buy on credit at an exorbitant price, often when cash would permit the purchase of household needs from a greater variety at a better price. Sickness or death in the family is a calamity always, but how much more so in the case of a poor man whose only knowledge of financing is got from his dealings with the paymaster on the one hand and the grocer, butcher, etc., on the other.

That the fortnightly pay day is feasible, is amply proven by the fact that it is observed by many of the largest concerns in the country both east and west. There is another phase of this question and an important one that should not be over-looked, and that is that notwithstanding all that is said about the unreliability of employees after pay day, we believe that they would evince greater interest in their work, be more steady and valuable were the more liberal policy adopted. They naturally gravitate towards what in their estimation are the most desirable positions, which becoming filled by the most select men, leave the less desirable ones for the less desirable positions.

Many arguments might be urged in advocacy of this plan, but we leave the subject with the hope that at some not distant day the plan of paying once a month and sometimes keeping back a week or ten days will be a thing of the past.

WHAT OTHERS SAY.

IN the February and March numbers of THE FOUNDRY we felt called upon to warn our friends in various parts of America to be very careful in any transactions they might have with the Hartsfeld Furnace & Refining Co., Newport, Ky. This provoked the gentleman (?) after whom this concern is called and who is its moving spirit, into writing a couple of letters to this office demanding a retaliation, etc., or warning us to prepare to suffer the consequences. Our imagination, of course, was immediately filled with visions of a law-suit for some fabulous sum or the prospect of the editor of THE FOUNDRY spending a few years in the solitary confinment of some of the many handsome state prisions for which this country is noted.

The last letter we received from this very consciencious and honorable gentleman was dated April 17th, and he kindly gives until this number is printed to make the "amende honorable" or suffer the consequences. This letter also contained one of their regular printed circulars, giving a list of several score of names, some of them well-known iron and brass founders in all sections of the country, who it was said would bear witness to the astonishing results attained by a use of the marvelous ingredient, which, if its manufacturers are to be believed, possesses merits akin to the philosopher's stone of my thological fame. Letters were sent to about forty of the names given, and although several were returned stamped "No such party as address given," yet we received, we believe, replies from all the others and not one had a good word to say for the mixture. It was not our intention to devote further space to this worthless subject, but the receipt of the following from the Portland Stove Company caused us to alter our decision, and we reproduce accordingly their letter and extracts from a few of the many others in our possession. From all sources we have received about one hundred letters, fully indorsing the position we had previously taken.

PORTLAND, ME.

Editor of "THE FOUNDRY," 172 Griswold St.

DEAR SIR:—"Your inquiry of the 20th inst. is received and it would oblige us if you would give the following insertion in your columns as we are having frequent inquiries." Some four or five years ago we made a trial of the Aluminum Alloy, manufactured by the Hartsfeld Furnace & Refining Co., of Newport, Ky. Our experiments with it did not give the results claimed by the manufacturers, and we discontinued its use as being worthless for our business.

We have not given the company, manufacturing it, any testimonial as to its value and do not see why we should be referred to as users of it." Very respectfully,

PORTLAND STOVE FOUNDRY CO.
F. M. Lawrence, Treas.

One of the best known foundries in Mass. who say they do not want their names mentioned, say:—

"In reply to your inquiry of April 13th, would say that the use of our name by the Hartsfeld Furnace & Refining Co. is not only unauthorized by us, but we have forbidden them to make use of our name. We had a barrel of the so-called "Aluminum Alloy Composite" and did not succeed in finding the advantage claimed for it. While we are not pre-

pared to say that it is an absolute humbug, we certainly should not speak favorably of it, and the manner of the company continuing to refer to us and others in this manner, is in a certain degree evidence against the material."

The Campbell Cotton-Compress Co., Cincinnati, writes as follows:—

"The use of our name on the circular issued by the Hartsfeld Furnace & Co. was unauthorized by us, and while we did buy a small quantity of their Aluminum Alloy we did not use it, so we are not able to say what its merits are. So much of the circular as refers to us is a fraud and people who will use a name in this manner are liable to commit other frauds."

The Lamp & Miller Mfg. Co., Milwaukee, Wis., write to the same effect:—

"In reply to yours of the 21st inst., would say that we are not using Aluminum Alloy Composite since 1885 as the circular you mention states. About two or three years ago, through a lot of circulars sent to us, we were induced to order a sample lot of 100 lbs. We considered that we had wasted our money after having tried it four or five times, finally we put what was left on the ash pile. *If it was cheap enough it would perhaps be nearly as good as gravel for filling.*"

Here is another from the Baldwin Locomotive Works, Philadelphia:

"Replying to yours of the 20th, the use of our name on the circular sent out by the Hartsfeld Furnace & Refining Co., as to their Aluminum Alloy was entirely unauthorized. We cannot give you any information on the subject. We are not using the material."

More, Jones & Co., St. Louis, Mo., say:—

"Would say that we received their circular something over a year ago and purchased a small quantity of the "Alloy" to try it, but upon examination could not find any merit in it."

Myer & Scrage, Sheboygan, Wis., reply as follows:—

"We know nothing about it, since we never used it."

Received from the Superintendent of Motive Power, Penn. Lines, west of Pittsburgh R. R.:—

"We would advise that we have no record of ever having used this material."

Central Machine & Fdy. Co., Quincy, Ill., say as follows:—

"We did try a sample from the Hartsfeld Furnace & Aluminum Co. of what they called "Aluminum Alloy" and after trying it, we came to the conclusion that it was no better than lime-stone, if as good. In fact, we could not tell any difference whether it was used or not. We do not understand how they came to use our name, saying that we recommended it. Please send us one of their circulars where they use us as a reference, if you have one. We do not think the stuff is of any account whatever."

This from the Harlan & Hollingsworth Company, Wilmington, Del.:—

"We wish to say that the Hartsfeld Furnace & Refining Co. never had our permission to use our name as a reference for their Aluminum Alloy and they got it merely from our having purchased a sample of it, and further that it was not satisfactory and that we have no intention of recommending it."

Here is another from the Lennox Machine Co., Marshalltown, Ia.:—

"Our experience was not satisfactory, we find that the use of good pig-iron gives us the best results. We would judge that they were short of references as we used only 100 lbs."

A large concern in Montreal, Canada, who do not wish their names mentioned, write as follows:—

"We beg to advise you in confidence that we purchased a small lot of Aluminum Alloy some time ago and as far as our experience goes, we believe the whole matter to be a fraud. They used our name without our knowledge or consent and you are at liberty to make any use of this information which you think wise, but do not mention our name."

In conclusion we would simply advise the Hartsfeld Co. to let THE FOUNDRY alone, as we do not care to advertise either them or their material and have only acted strictly within our rights in this case. We have other letters of a still more emphatic nature which will see the light of day through these columns if we hear anything further from them.

NOTICE.

All advertisements under this head given two insertions free of charge when placed therein by subscribers. All others will be charged 2 cents per word for each insertion.

WANTED—A position as foreman in a foundry by a molder who has had fourteen years experience in the north of England as a locomotive and marine molder, also four years at government work at Armstrong's, with ten years as a machinery molder in the United States. Address, John Faleers, 530 Chase avenue, Joliet, Ill. *

WANTED—Superintendent for large iron manufacturing plant, one that understands all branches of iron foundry and pipe work. Young man preferred. Post office box 437, Montreal, Canada. *

WANTED—A first-class stove-pattern filer and fitter, one who has had some experience on radiators preferred. Address, H. Belfield & Co., Norristown, Pa. *

SITUATION WANTED—An experienced and energetic iron molder, fully capable of taking charge of a foundry, would like a position of that kind. Good references. Address, Experience, this office.

AN ENERGETIC EXPERIENCED IRON MOLDER who fully understands the charge of men, wishes a posi as foreman. Address Energetic, this office.

IF THE PARTIES, who advertised in April number of "The Foundry" under title of "Change" and "W. P. B.," will communicate with this office they will receive some replies.

JOHN WALKER.

ALTHOUGH the foundry business cannot pride itself upon having the honor of claiming Mr. Walker as exclusively its own, yet his whole life, from boyhood up, has been so closely interwoven and identified with it, that it can justly be said of him that while, perhaps, not a practical molder, yet there are but few of those who are, who have made a closer study of the business, have been more closely identified with it or have left upon it the impress of their strong mechanical individuality more than he. He was born on August 3d, 1847, at Middlesborough, a town situated on the rugged north-east coast of England. His father, James Walker, was an iron founder, who could sleek a mold, pour a casting, and as has been said, could make a contract as well with the best workmen in the great foundries of the ironopolis of England. It was here, amid the blast furnaces, rolling mills, foundries, shipyards, docks, in sight of the German ocean, grand old Cleveland hills, and purple moors of Yorkshire, that John Walker first saw the light, and where he spent his early years. He was educated first in a common school, finishing off at the private academy of Thomas Ainsworth, a stern old pedagogue of the ancient-regime, and then served 7½ years of apprenticeship in the workshops of Bolchow, Vaughan & Company, Middleborough, the largest iron concern in the world, with a capital of fifteen and one-half million dollars.

MR. JOHN WALKER.

His first experience was obtained in the workshops of Leeds & Manchester; but, Mr. Walker, like many other engineers, was not contented to remain where he was, and in 1871, having had considerable experience both in machine shops and as a patternmaker, he decided to come to America. His first connection was in a good school, for soon after he arrived in Philadelphia, he found employment with the well-known firm of Wm. Sellers & Co.

Mr. Walker went through the experience many leading American engineers have had of moving about from place to place, an experience which has done as much, if not more, for Mr. Walker than it has done for others. It broadened his ideas and increased his ability. During these ten years he was successively connected with Wm. Wright of Newburgh, N. Y., and Poole & Hunt of Baltimore, Md., and for several years before the organization of the Walker M'f'g. Co. with the Nordyke & Marmon Company of Indianapolis. It was at this latter establishment that many ideas now in use in Mr. Walker's establishment are to be seen. Patents granted him up to 1888 for shaft couplings, molding machines, gear molding machines, traveling cranes, cable machinery, etc., numbered twenty-five, prominent among them and of especial interest to foundrymen, being his gear and pulley molding machines which are really marvelous pieces of mechanism capable of a range of work and a degree of adaptability when a difficult piece of gearing is to be molded, that is really surprising, enabling this company to make gears of

any size or shape which are perfectly true and in which each tooth is an exact counterpart of the other.

Mr. Walker is a member of the Engineers' Club of New York and was one of the early members of the American Society of Mechanical Engineers and also the Civil Engineers' Club of Cleveland, Ohio. He is an entertaining conversationalist and a man whose perseverance and energy is proportioned to a splendid physique. To his enterprise and sagacity is due the existence of the magnificent works of the Walker M'f'g. Co., which, with its cloud of smoke by day and its pillar of fire by night, mark the spot where great achievements are being worked out.

$500.00 FOR A WORD.

HERE IS THE PARAGRAPH.

"I now behold, said he, what I never could believe, the glories of this stupendous..... "

[Missing word.]

This complete sentence has been previously printed and can be found in most libraries. It will again be printed complete in an early issue of THE ILLUSTRATED WORLDS FAIR, announcing page and name of publication.

The publishers of *The Illustrated World's Fair*, Chicago, offer the person or persons supplying the correct missing word to the above paragraph, $500.00.

If you wish to enter contest, send 25 cents for a copy of *The Illustrated World's Fair* containing coupon and instructions governing contest. Ask your newsdealer for it. It is the finest, most attractive, ably edited and profusely illustrated magazine in the world. The only official publication illustrating the progress and every phase and feature of the great Exposition from start to finish. It is an album *of photographic art. It is a library of literary* gems. It is brimful of contributions from *great celebrities. The bound volumes make a* complete pictorial and literary history of this stupendous enterprise; 22 consecutive numbers and 3 bound volumes ready for delivery; we want local agents in every town, city and county to take orders for this incomparable work. It sells itself when shown; any man, *woman, boy or girl can sell it; send 25 cents* for sample and special terms; great inducements *to subscription book people; exclusive* territory. Address *The Illustrated World's Fair* (P. O. Drawer "T"), Jewell N. Halligan, General Manager, McVicker's Theater Building, Chicago. Read Pice List.

AMONG THE MAGAZINES.

The many admirers of Rosa Nouchette Carey will be gratified to learn that the complete novel in the May number of *Lippincott's* is from her facile and well-tried pen. Its title is "Mrs. Romney."

The third in the series of Lippincott's Notable Stories, "A Pastel," by Cornelia Kane Rathbone, is a delicate and touching sketch of wasted loyalty and disappointed hope. It is illustrated throughout.

James Cox furnishes a full and glowing account of "New St. Louis," illustrated with cuts of a dozen of the huge buildings which have lately risen in that thriving and progressive city.

John Bunting traces the origin and history of "The Society of the Cincinnati," with the violent objections which were raised in its early days against its supposed aristocratic character and dangerous tendency. This article also is illustrated.

Mrs. Gertrude Atherton supplies a short but appreciative account of the American sculptress Kuhne Beveridge, with a cut of her most notable work, "The Sprinter."

Professor L. M. Haupt has a brief article on "Colonel Pope and Good Roads."

M. Crofton, *in "Men of the Day,"* gives sketches of William Morris, the poet, Arch-*Bishop Satolli, and Secretary of* War Lamont.

The poetry of the number is by Louise Chandler Moulton, Dora Read Goodale, Charlotte Pendleton and *Arthur D. F. Randolph.*

The *Review of Reviews* for May, without *pretending for a moment to invade the special* domain of the elegantly illustrated monthly *magazines, may perhaps claim to surpass any* of them in a certain quality of original and timely interest in its pictures. It contains, all told, about one hundred illustrations. *They* pertain to the World's Fair, to the naval review, to the flag-raising on the *Navesink Highlands,* of April 25, and the casting of the Liberty Bell *on May 1 at Troy, to the reception in New York* of the Duke of Veragua, the lineal descendant *of Christopher Columbus; to Mr. Cleveland's* various important appointees, including perhaps a dozen of the most important new foreign ministers and the principal commissioners and chiefs of bureaus.

A novelist and editor whose name is a household word in America and Europe, recently remarked, as a friend found him amid a pile of newspapers, "The only periodical I read through is *The Youth's Companion*—and I read that through every week." "For your children, I suppose," said his visitor. "No, for myself," was the reply. "It is a wonderful paper."

The announcements of *The Youth's Companion* for 1893 make this story easy credible. Seldom, if ever, has it presented so varied a programme of articles and stories, or so striking a list of eminent contributors. It never ceases to be a young people's paper; but it long since lifted itself to be also a most versatile, instructive and facinating paper for all the family. One of the marked features this coming year is the appearance of the seven successful stories for which the famous prizes of $6,500 were awarded. No less than 2,963 stories competed for these prizes. The regular "every-day" stories of *The Companion* will be contributed by over 100 authors, all of them popular, and some of them the best-known story-writers in America. Only $1.75 a year.

The Youth's Companion, Boston.

The large number of pictures in the May *Popular Science Monthly* is the first feature to arrest attention. The number opens with a charming account of Japanese Home Life, by Dr. W. Delano Eastlake, which has many characteristic illustrations. There is also a description of the Oswego State Normal School, one of the best institutions of its class, by Prof. William M. Aber, with views of class-rooms and laboratories, and portraits of instructors. Prof. Byron D. Halsted contributes an illustrated article on the practical subject "Decay in the Apple Barrel," and Prof. G. F. Wright defends his recently attacked book in an article under the title "Evidences of Glacial Man in Ohio," also with many illustrations. The able argument by Herbert Spencer, on "The Inadequacy of Natural selection," is continued in this number. Mr. G. W. Littlehales, of the United States Hydrographic Office, describes "The Growth of our Knowledge of the Deep Sea." Prof. Wesley Mills advocates the "Cultivation of Humane Ideas and Feelings." P. E. M. Berthelot recounts "The Discovery of Alcohol and Distillation." "How Science is Helping the Farmer," is told by Prof. C. S. Plumb. Other articles are "Dietary for the Sick," by Sir Dyce Duckworth;" a Tribute of the French Academy to American Geological Exploration; and a Sketch with Portrait of Prof. Samuel William Johnson.

New York: D. Appleton & Company. Fifty cents a number, $5 a year.

A certain amount of social life is absolutely essential to all of us—to the old as well as to the young, writes Edward W. Bok in a pertinent article on man's inability to see things as others see them, in the May *Ladies' Home Journal*. A woman never grows so old that she ceases to enjoy the company of others, and generally the older she grows the more she enjoys it. It is always a pity to see a man fall into a state which he explains by saying; "Oh, we're getting old, and don't care for so much variety in our lives." In the pure unselfishness of his soul he always speaks of "us" and "we," as if it naturally follows that because he is getting antiquated his wife must keep pace with him in his decline. Men all too often make their wives too old. It is a greater credit to a husband to keep his wife young than to make her grow old. His actions and his habits necessarily influence those of his wife. Let him keep in touch with the world, and both he and his wife will be better and the younger for it. I like to see a man proud of his wife because she keeps young. Old age is beautiful and has its advantages, but a man makes a great mistake when he rushes a woman unnecessarily toward it. And he does it most perfectly when he deprives her of those enjoyments which every man should give his wife. No economy is so false, so hollow and so misguided as that which seeks to withhold one pleasure from the life of a good woman, a true wife or a loving mother. The best home a man can give a woman becomes "poky," as one woman I know expresses it, if she is asked to live in it three hundred and sixty-five days out of every year. The good Lord knows that woman's life in this world is hard enough. She travels a path of endurance and suffering, to which man, be he ever so heavily afflicted, is an entire stranger. It was given to man to make that path as pleasant, as easy and as bright as possible. Every dollar which a man spends for the happiness of the woman of his home will come back to him in double, yea, in four-fold measure.

A New York daily paper taking up the idea conveyed in Flammarion's exciting novel,

"Omega: The Last Days of the World," has interviewed a number of the leading men in all professions as to what they would do if science were to predict to-morrow that the end of the world would arrive within the next thirty days. The answers are various and curious, and heighten the interest which is felt in the second part of Flammarion's great novel, which appears in the May *Cosmopolitan*. It is a question which everyone will find interesting to ask of himself: What would you do if within six weeks the end of the world were certain? Probably no novel which has ever appeared in an American magazine has been more elaborately illustrated by more distinguished artists. Laurens, Saunier, Vogel, Meaulle, Rochegrosse, Geradin and Chovin all contribute to the explanation of the text.

A clever story of another kind is that of the new English novelist, Gilbert Parker, in the same number. "American Society in Paris" is an article of another kind, but one which will interest all who have had occasion to make even a short residence in the French capital. *The Cosmopolitan* scores a success in producing its May number, almost simultaneously with the daily papers, an elaborate description of Professor Gray's marvelous invention, the Telautograph, which reproduces the handwriting, or the work of the artist, simultaneously, thousands of miles distant from the place where the writer or artist is sitting. Mr. Howells' purpose in "The Traveler from Altruria" is, month by month, becoming more evident, and is now receiving wide attention at the hands of the critics all over the world.

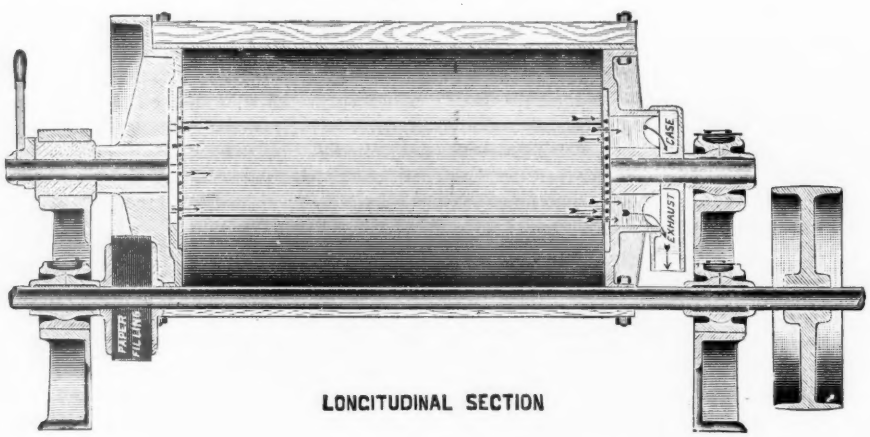
The *New England Magazine* for May opens with an interesting account of the relations of Phillips Brooks to Harvard University, both as a student and religious teacher. The article is finely and fully illustrated with sketches by Louis A. Holman, and from photographs taken specially for the purpose. A very attractive article which every boy who has felt the fascination of reefers and gold buttons will want to read is "Life and Study at the Naval Academy," by Walter G. Richardson, Ensign U. S. Navy. The article gives an account of the routine, the study and social life of the Academy, and is finely illustrated from photographs taken specially for this purpose. Lucy P. Higgins gives a description of "Old Ship-Building Days at Duxbury." Mary A. P. Stansbury has a little poem called "His Last Word," based upon the dying words of Phillips Brooks, "I am going home." Caro Atherton Dugan writes about "A Historic Doll.', Irene Putnam contributes a delicate poem "Of Love." Ashton R. Willard is the writer of a very interesting paper which gives the history of the "Cavalleria Rusticana," with some biographical details concerning Pietro Mascagni. Mrs. Helen Campbell's serial, "John Ballantyne, American," is continued, and the interest sustained. William Howe Downes, the art critic of the *Boston Transcript*, gives a resume of the exhibit of New England Art at the World's Fair. The article is finely illustrated. Arthur C. Grissom contributes a clever short story called "A Professional Lover," which has a delicately pathetic ending.

The S. Obermayer Co. have been appointed sole agents for the Blakeney cupola.

THE WOODRUFF PATENT SEPARATING MACHINE.

THE Audubon Machine Works, New Haven, Conn., report a constantly increasing sale of their Woodruff Patent Separating Machines. No better proof of their popularity could be shown than the fact that quite recently such well-known concerns as the Farrell Foundry & Machine Co., Ansonia, Conn., and the Brooks Locomotive Works, Dunkirk, N. Y., both of whom have used them for years, have ordered additional machines with a larger capacity.

One of the points in its favor being that it can be set anywhere in doors or out under shed, wherever power can be secured to drive it, and as a barrowful of cinders, etc., will go through in 3 or 4 minutes, all the iron being deposited in a box provided for the purpose and the balance of refuse in rear of machine, it being claimed that the economy effected by its use will pay for its original cost in a short time, they should be in general use in all foundries melting from 2 ton a day upward.



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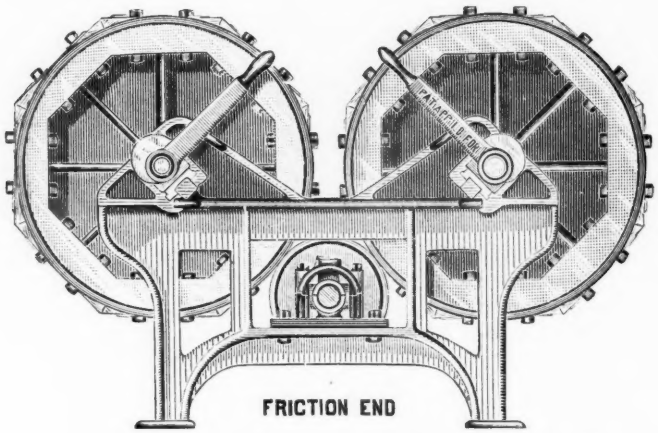
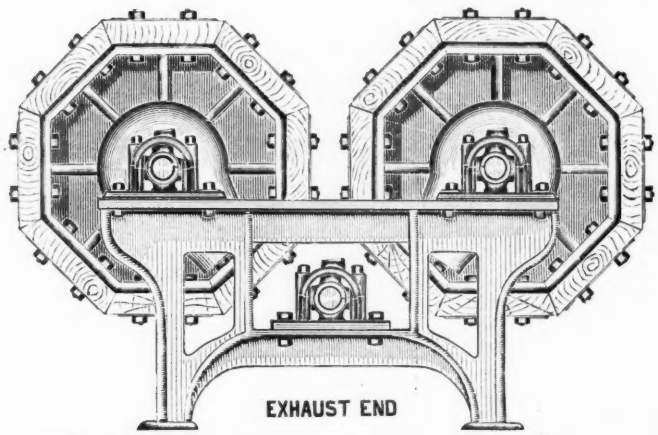


FRICTION END

MORROW'S IMPROVED TUMBLING BARREL.



EXHAUST END

MORROW'S IMPROVED TUMBLING BARREL.

WE present to our readers this month something in the way of a tumbling barrel, designed by Mr. G. L. K. Morrow, Supt. of the Murphy Iron Works, Detroit, Mich., for which many advantages are claimed, the principal

one being that it is but little liable to get out of order as it has no springs to break, no clutches to give away, no gear wheels to tear the teeth out when starting, no chain belting to break, no lock friction to break in case pieces of iron fall between friction wheel and driving rim, and no moveable bearings with long threads and nuts to wear out.

Each barrel of a pair can be operated independent of the other, one being kept running while the other is being emptied and filled. As will be seen by the illustration which we submit herewith and which needs no description, they are operated by friction, each barrel being set in a bearing that rests obliquely on the paper-filled driving wheel, all that is needed to start or stop the barrel's operation being the throwing in or out of a lever working on an eccentric shaped bearing—one advantage of this operation in particular being that the amount of friction regulates itself by the weight of the work in the barrel and not from the pressure of a screw or wedge. The exhaust cap is malleable iron with a long central bearing on the shaft of barrel. This gives the advantage of having the joint at the outer circumference of exhaust opening a close fit.

They are made in all sizes with cast iron staves or wood staves, steel lined, and can be arranged in a continuous row of from one to six pair and driven from one shaft. F. B. Stevens, 74 Griswold St., Detroit, Mich., will quote prices if desired.

FROM FOREIGN LANDS.

JUST to let our readers know what is thought of THE FOUNDRY in distant parts of the world we take the liberty of reproducing some extracts from a couple of letters received at this office almost by the same mail from portions of the world widely separated from each other.

The first from R. A. Hadfield, of the world-renowned Hadfield Steel Foundry Company, Limited, of Sheffield, England and the second from James W. Dwyer, son of Jeremiah Dwyer, President of the Michigan Stove Company, Detroit, Mich., and himself a well-known foundryman, especially in St. Louis, Mo., and Detroit, Mich., he having been connected at one time with the Buck Stove & Range Company in the former place and for about ten years with the Michigan Stove Company, Detroit, but now with the West Australia Foundry Company, Perth, West Australia.

Sheffield, Eng., March 24, 1893.

DEAR SIR—"I am in receipt of a copy of your February issue, and must say that no paper has interested me more than THE FOUNDRY. Having been engaged in foundry practice for many years I have often been struck by the want of information on this particular subject; in fact I think, Mr. Editor, if we had more daylight thrown on foundry practice, the scrap heap would not be so large nor our losses so heavy in this direction, whether relating to iron or steel practice.

Will you let me have a complete set of your back numbers, that is, for 1892, for which enclosed please find post office order. I hope you will be able to "cast" me the January number, but do not make the usual high charge for "one off."

I am glad see my friend, Mr. Keep, contributing to your excellent journal, and wish you every success in the good work you have undertaken."

Yours truly,

R. A. HADFIELD.

Perth, Feb. 22d, 1893.

MR. JOHN A. PENTON,

Sec'y and Treas. THE FOUNDRY.

DEAR SIR.—Permit me to acknowledge receipt of yours of Jan. 4, also copies of your excellent publication and heartily compliment you on same, it being issued exclusively in the interest of the foundry business, it is, no doubt, destined to be a very popular paper. We have three foundries here in Perth, viz: Messrs. Jos. Tomlinson & Sons, The City Iron and Brass Foundry, and The West Australia Foundry Company, as above, also The Union Foundry Co. of Fremantle, an adjacent town. The Colony of West Australia, though one of the oldest in point of years of the Australian group, yet is one of the newest, having just been granted respon-

sible government (as it is here termed) *i. e.*, electing their own members of parliament, the upper and lower House. Heretofore it was governed entirely by the Home or Imperial Government. The Colony is now having a steady boom and every prospect of a bright future before it. It is the largest Colony in area and especially rich in minerals, particularly gold, both quartz and alluvial. The West Australia Foundry Company is the largest and best equipped in the Colony, employing some fifty odd workmen. The others mentioned are much smaller and cast, say, once or twice a week, all using English and home-made gas coke and English and Scotch Irons. The flasks or molding boxes are of iron invariably and these and others of our tools, equipments, &c., would, no doubt, to you appear *very primitive and of an ancient order*, still we are progressing and, no doubt, your valuable journal will assist us in this direction. In my next will endeavor to comply with your request and give you a little outline and history of the foundry business in this part of the world.

In the meantime wishing you and your paper every success.

I remain with kind regards,

Yours respectfully,

JAS. W. DWYER.

AMONG THE FOUNDRIES.

Ellis & Helfenberger, Indianapolis, Ind., are very busy.

Two Chicago companies, viz: the South Chicago Foundry Co. and South Chicago Steel Co. have gone into the hands of receivers.

The time-keeper at Fuller & Warren Co.'s foundry, Troy, N. Y., was arrested recently, charged with swindling the company by raising the pay of some of the men on his books.

The West Point Foundry, West Point, N. Y., have received the contract for seven spring return mortar carriages for the 12" breech loading rifle mortars at $6,780.00 each. The first one is to be delivered in six months and the remainder to follow at periods of two months each.

The Record Foundry and Machine Co., at St. John, N. B., has increased its capital from $35,000 to $60,000.

Chattanooga, Tenn., foundries all report trade good with good prospects ahead.

The employees of the foundry of J. Emory Jones at Rochester, N. Y., went out on a strike March 27th because of their objection to the foundry foreman.

There is a fire department in the Auburn state prison composed entirely of convicts, and which it is said did good work in the recent fires in the prison foundries.

The W. H. Howe Foundry Co., Geneva, Ill., was closed by the sheriff April 8th, but the matter was subsequently arranged and the works allowed to continue.

The foundry of the West Superior Iron and Steel Co., at West Superior, Wis., is as busy as every other department in that mammoth concern and is capable of turning out a lot of work. It is 70x300 ft. with core room 150x250. There is one cupola with a marked capacity of 45 tons per diem, but they have worked it up to as much as 65 tons per day with a complement of 140 men. There are two large pits for pipe castings with three steam cranes on each. On the jobbing floor they have a twenty-five-ton steam crane, and three hand cranes. Their biggest casting, so far, were the housings for the plate mill shears, twelve tons each. Castings of five and six tons each are of daily occurrence. Of pipes, they cast anything from four to sixty inches; all kinds of mill machinery, engines and engine beds, in fact they can handle anything from the smallest to the biggest. The brass foundry, 40x50, is fully equipped and capable of doing all their own work, including all outside orders. Mr. Thompson, the foreman, is a native of Denmark, and has worked in foundries since he was fourteen years old. He is so full of work and is so wrapped up in his own particular business that he has no room or time for anything else. He is proud of the fact that he took off the first heat in West Superior.

The Mechanics' Iron Foundry have been awarded the contract for city castings in Boston at $1.74 per 100 lbs.

The Lansing Iron and Engine Works, Lansing, Mich., have become embarrassed, it is said that everything will be paid in full.

Ten years ago the foundry of the West Milwaukee Car Shops, West Milwaukee, Wis., melted 10 tons of iron daily, now they melt from 100 to 110 tons daily.

The Berlin Iron Bridge Co., of East Berlin, Conn., have received the contract for the new rolling mill building from the New Haven Rolling Mill Co., at New Haven, Conn.

The Marinette Iron Works, Marinette, Wis., have received an inquiry from Kansaw, Russia, near the head of the Volga river, for prices for band mills, plaining mills, circular saws, etc.

The Atlantic Improvement Co., of Long Island City, Long Island, N. Y., have placed the contract for their new power station, consisting of an engine and boiler house and dynamo room with the Berlin Iron Bridge Co., of East Berlin, Conn.

A cheap bronze for light castings is given as follows: Sal ammoniac, 1 drachm; oxalic acid, 15 grains; vinegar, 1 pint; mix. After well cleaning the article to be bronzed, warm it gently and brush it over with the liquid, using a small quantity at a time. When rubbed dry repeat the application till the desirable tint is obtained.

Owing to increased demands for the Colliau Cupola Furnace, Messrs. Byram & Co., have added eight (8) new sizes to their list, giving a total of sixteen (16) different sizes to select from. During 1892 the demand for this furnace has exceeded any previous year up to the present time. The Condor Iron Foundry Co., East Boston, Mass.; The Oliver Bros., Lockport, N. Y.; The Auburn Prison, Auburn, N. Y.; Ohio Falls Car Mfg. Co., Jeffersonville, Ind.; Union Lock Co., Lancaster, Pa.; The Tuttle & Bailey Mfg. Co., Brooklyn, N. Y., are mentioned among their more recent shipments.

The McShane Foundry, Baltimore, Md., is preparing drawings for the largest bell on the American continent. It will be named "the great bell of America." and will weigh 44,000 pounds, 1,000 pounds for each state in the Union.

The Berlin Iron Bridge Co., of East Berlin, Conn., have received the contract for a new bridge at Norwich, Conn., to span the tracks of the Norwich and Worcester branch of the N. Y. & N. E. R. R. over the Shetucket river. The bridge will consist of one span of 145 ft. with a roadway 24 ft. wide in the clear and two sidewalks each 5 ft. wide in the clear. The roadway and sidewalks will both be covered with buckle plates and concrete.

NEW YORK AND VICINITY.

The American Aluminum Co., 753 Hicks street, Brooklyn, N. Y., have put in operation (about the 15th of April) a new reverberatory or air furnace with capacity of 1,500 lbs., the results obtained have been entirely satisfactory.

It appears that matters were not running smoothly amongst the managers of the Carrere & Haas Iron Works, Brooklyn, N. Y., for some time. The outcome was that the stockholders appointed Mr. J. M. Carrere receiver on the 6th of April, the shops were then closed and the employees paid all wages due them. It is reported that the liabilities are $90,000, assets $140,000. It is not likely they will resume.

The firm of Smith & Rodahan, iron founders, at Brooklyn, N. Y., made an assignment to Jas. Kelly (metal dealer in the same city) about the first week in March. The plant was sold at auction three weeks later, friends of Mr. Smith bought it and it has been in operation under his management since then. The liabilities have been met to the extent of eighty cents on the dollar and it is claimed they will be paid in full in a short time.

The foundry and shops of the Manhattan Iron Works, (architectural) operated by H. Stuetzer & Co., Brooklyn, N. Y., were attached by the sheriff April 10th. Following the first execu-

tion, nine others were filed in rapid succession. The plant was sold out by the sheriff in lots April 26. There was not enough realized from the sale to pay the claim of Chas. E. Ring, the plaintiff in the first execution. It is claimed that wages amounting to nearly $1,000 are due their employees.

The Davenport & Treacy Co. have recently ordered one of Byram's Colliau Cupolas for their foundry at Stanford, Conn. Other improvements are contemplated as soon as the summer season begins. The firmintending to keep abreast of the times in the production of their specialty of piano hardware.

BOOKS, EXCHANGES, CATALOGUES, ETC.

Those in need of the very latest thing in the way of improved foundry appliances will be interested in a neat circular in leaflet form sent out by the Walker M'f'g. Co., illustrating their cranes, ladles, sand sifters, (with bracket for transmitting rope power for driving the latter), etc. These articles are fully described by appropriate reading matter.

The S. Obermayer Co., Cincinnati, are sending to the trade a neat postal calling attention to the many points of advantage claimed for their new improved Peerless Plumbago, to be used wet or dry, either in loam, dry, or green sand molds for heavy or medium weight castings, to be applied with brush, bag or hand. We have also received from the same source a neat little catalogue devoted entirely to illustrating the fine line of emery wheels carried by this concern especially for foundry purposes.

F. B. Stevens, of Detroit, Mich., is determined that his advertisement shall not only be seen, but "placed on file." His latest is a neatly designed four-page sheet, one of which is left blank and used as a letterhead, while the other three are got up in newspaper style with editorials, news items, etc., and any number of readable advertisements designed to prove that "F. B." has the best of everything. He is also bringing out something new which he is advertising by means of a neat card entitled "Salamander Wash for loam, dry or green sand."

The "Cooper Engine" is the title of a very handsome catalogue issued by Cooper, Roberts & Co., Mt. Vernon, O., and which explains in detail the salient points of their well known high-speed engines.

J. W. Paxson & Co., of Philadelphia, send us a letter on a new letterhead which is a gem as a specimen of the lithographer's art and contains a splendid and truthful view of their extension warves and dock sheds, facing mills, etc., in miniature.

The Bridgeport De-Oxidized Metal Co. send us a neat catalogue of about 60 pages which contains a vast amount of information on the subject of anti-friction metals for all purposes, and also metals, which, by their process are rendered proof against the ravages of time, weather, water, gases or acids.

We have received from the Thomas M'f'g. Co., Little Rock, Ark., a very neat catalogue illustrating their cotton-press elevating machinery, which we have found very interesting as showing what the 19th century produces, in the way of automatic machinery to do the work that could only be accomplished by large numbers of men.

Geo. S. Emerick & Co., Philadelphia, send us their first catalogue which seems to cover the ground pretty thoroughly and shows the latest competition for the foundrymen's patronage to be aware of the truth of the adage that "Brevity is the Soul of Wit." It is refreshing to find another concern that does not devote valuable space to claiming that they are the oldest, greatest, largest, etc.

George Walworth for 58 years a resident at Westchester, N. Y., died Friday at Peekskill, aged 75 years. He was for many years in the foundry business before the war, as a partner with Jas. Boyd, and later as a member of the firm of Belae & Walworth, of Yonkers, N. Y. He retired in 1883 with a competence. His widow and two daughters survive him,

Questions and Answers.

In reply to D. J. V., who asks a question in March issue concerning copper castings, I would suggest that he use the following receipt: Copper, 100 lbs.; pulverized cryolite, 1 lb.; borax, 1 lb.; sugar of lead, 4¼ ozs. For smaller quantities same proportions.

INVENTORS AS MEN OF BUSINESS.

THE sympathy of the world has always been with the inventor, even when his misfortunes have been the results of his own folly. But the sympathy of the world is usually a very cold thing, and it is not surprising that the inventor derives little material benefit from it. Just now it happens that the press of the country is recording several instances of hapless inventors who are ending their days in misery, when a trifle of what their genius has produced would suffice to brighten the last scene of all. There is Taylor, the man who invented the baby carriage, to whom we are all so much indebted. He is reported to be ending his life in an almshouse. Then there is Herman Gross, a man who looks like Henry George. He claims to have invented the cable system, from which so many millions have been derived. An enterprising newspaper discovered him in New York, where, at the age of sixty-five, he is living in such great poverty that he cannot establish his rights to the mode of quick transit that has become so popular. Mr. Gross says that in 1854, while experimenting on a perpetual motion machine, the idea of an endless cable for street railways occurred to him. After serving through the war he proposed his scheme to some capitalists. The model he built was stolen, and he never received a cent from his invention. Rapid transit seems to have been a bad thing for inventors, for the Philadelphian who first suggested elevated roads died recently without realizing on his idea. From England comes the sad story of Michael Balfe, whose father was the composer of "The Bohemian Girl." He invented the light for bakers' ovens, which is in general use. Instead of obtaining a patent he eked out an existence by traveling from city to city, establishing it. Misfortune followed him wherever he went, and, after being a jack-of-all-trades in all parts of the world, he is now ending a ruined life in the Field-lane Refuge, London. While these stories have a pathetic interest, they do not prove, as is so often contended, that invention affords a poor means of livelihood. We have now too many successful instances to judge only from the failures. Outside of their inventive genius altogether, these men were lacking in some of the elements that go to make up success. Whatever occupation in life they might have chosen, the result would have been the same.

PERSONAL MENTION.

John B. Roberts, formerly a proprietor of a foundry in Fostoria, O., died recently at his home in Brooklyn, N. Y.

Mr. Andrew W. Fyfe has sold out his interests in the Bell & Fyfe Foundry Co., of Brooklyn, New York, and has recently been appointed to the position of assistant superintendent at the New York works of R. Hoe & Co., manufacturers of printing presses and saws, New York and London, England.

Amos C. White died at his home in New York City April 3rd. Mr. White was 86 years old and the survivor of the firm of M. M. & A. C. White that operated the Globe Foundry and Iron Works at Thirty-fourth St., bet. Tenth and Eleventh Aves., New York City, from 1858 to 1882, when he retired, leaving an honorable record as regarded his business transactions and treatment of employees. His death will cause no interruption or alteration in the business or management of the foregoing foundry, as the Edward C. White Co., that have been operating it for several years, are descendants of the old firm, having the business entirely in their hands from the start.

NEW FOUNDRY ENTERPRISES.

Geo. Steele is putting up a foundry at Hammond, Ind.

Hancock, Mich., is to have a new foundry near the Osceola Foundry.

The Peerless Foundry Co., Philadelphia, Pa., has been organized. Capital $10,000.

Conneaut, Ohio, is to have a new foundry 60x60. Deane & Crane are the promoters.

Torrence & Son, La Crosse, Wis., are about to establish a foundry in Spring Valley, Minn.

The Barker Mine Car & Foundry Co., have been incorporated at Springfield, Ill. Capital $25,000.

The J. I. Case F. & M. Co., Racine, Wis., are about to erect a new foundry 80x300 ft.

The Hercules Foundry Co., Pell City, Ala., will remove its entire plant to Anniston, Ala., and double its capacity.

The Hover & Rentschler Foundry Co., East Hamilton, O., have contracted for 100x100 ft. addition to their foundry.

S. M. Thrall and H. A. Cassell, of Charleston, Ill., have purchased the foundry business of Robert McFarland Wichita, Kas., and are enlarging the plant.

A foundry will be erected at Chagrin Falls, Ohio, Joseph Leon Gobeille, of the Gobeille Pattern Works, Cleveland, O., being behind the new enterprise.

The Twin City Iron Works, North Minneapolis, Minn., has consolidated with the Minneapolis Foundry Co., and the new concern under the first name have secured the patterns formerly owned by the Patt Mfg. Co. The consolidated enterprise will be one of the most extensive in the north-west.

The plant of the Knoxville Foundry and Machine Co. has been leased by the Clarke Foundry and Machine Co. and will be put into operation about the 20th inst. The company bought this lease to relieve the over-crowded condition of its own shops and by this deal probably have the largest plant in that state.

Myers & Robins', of Springfield, O., have recently built an extensive addition to their foundry.

Work will begin at once on a foundry 74x260 feet at the Cramp's shipyard in Philadelphia, Pa. It will be of brick and iron, one story high.

The Cushion Car Wheel Company, of Indianapolis, Ind., has its foundry at Fort Wayne now in running order. The company has recently received orders from a large number of street car companies.

The new iron foundry of Gaar, Scott & Co., of Richmond, Ind., has been completed and will shortly be occupied. The structure is 100x200 ft. in size with 5 hydraulic cranes.

Advertisements inserted under this head for 25 cents a line each insertion.

WANTED—A foundry at Bevier, Mo. Bevier is situated in the center of a great coal field on the C. B. & Q. R. R., and invites your attention. To the right party we believe a splendid opening exists. Address, Bevier Board of Trade, Bevier, Mo. *

WANTED—Second hand Baker Blower of the highest pressure. Must be in first-class condition and cheap. Pingley & Co., Box 117, Birmingham Ala.

WANTED—A man to take charge of a new and very modern foundry—all green sand work. Six floor men and fourteen bench men. A man willing to work himself, good prospects for the right man. Address "Foundry," this office.

THE FOUNDRYMENS ASSOCIATION

TWENTY-THIRD meeting of the Foundrymen's Association, of Philadelphia, was held at the Manufacturers' Club, Philadelphia, Wednesday evening, April 5th, at 8 o'clock.

In the absence of the President, Mr. P. D. Wanner occupied the chair. The minutes of the last meeting were read and adopted.

The following persons were present: Mr. E. C. Lewis, Pres. of Waterbury Farrell Foundry & Mach. Co.; Milton R. Wike, Jerome, Keeley & Co., Phila.; Mr. Wm. W. Winks, Davis Coal and Coke Co., Baltimore, Md.; Mr. T. B. Harkins, T. B. Harkins Foundry Co.,

Bristol, Pa.; J. H. Pepper; *Iron Age* Phila.; Aza Whitney, L. B. Whitney, R. B. Liddell, of A. Whitney & Sons, Phila.; Josiah Thompson, J. Thompson & Co., Phila.; Wm. R. Brinton, J. Morton Poole Co., Wilmington, Del.; G. T. Marsh, Supt. of S. Baltimore Foundry, Baltimore, Md.; J. H. Julien, J. W. Hoffman & Co., Phila.; Robt. A. Register, J. Register & Sons, Baltimore, Md.; Chas. R. Schmidt, Hy. McShane Mfg. Co., Baltimore, Md.; E. E. Durant, G. F. Warner Mfg. Co., New Haven, Conn.; Ed. Bureau, Bureau Bros., Phila.; E. E. Brown, E. E. Brown & Co., Phila.; L. S. Wright and C. L. Prince, Camden Iron Works, Camden, N. J.; W. C. Henderson, Thomas Devlin & Co., Phila.; J. M. Warner, Rogers, Brown & Warner, Phila.; Justice Cox, Jr., Mahoning Rolling Mill Co., Danville, Pa.; Sellers Bancroft, Wm. Sellers & Co., Phila.; George A. Messick, Pusey & Jones Co., Wilmington, Del.; W. B. Ogram, Pottsville Iron & Steel Co., Phila.; J. W. Moore, Crane Iron Co., Phila.; Leslie Griscom, Penna. Diamond Drill & Mnfg. Co., Birdsboro, Pa.; Andrew McCardell, Pond Machine Tool Co., Plainfield, N. J.; James S. Stirling, Harlan & Hollingsworth Co., Wilmington, Del.; Harry Rebmann, G. Rebmann & Co., Phila.; Hy. Ruhland, Hy. Ruhland & Co., Phila.; Jones Wister, L. & R. Wister & Co., Phila.; H. C. Vansant, Morris, Tasker & Co., Phila.; A. W. Howe, Davis Coal and Coke Co., Baltimore, Md.; P. D. Wanner, Mellert Foundry & Mach. Co., Reading, Pa.; W. H. Green, Jr., Vulcan Iron Works, Chester, Pa.; J. W. Gephart, Valentine Iron Co., Bellefonte, Pa.; C. R. Baird, Chamberlain, Turney & Baird, Phila.; H. M. Bougher, and Howard Evans, J. W. Paxson & Co., Phila.

The Executive Committee reported that they thought it would be advisable for the "Price Committee" to report actual contracts taken at high prices rather than low prices, as the continual putting down of prices and the reporting of same, has a depressing effect upon the foundrymen and when reported gives the wrong impression to the customer. We think this Association will meet with better results by going on in the same way, trying to bring about a better feeling among the foundrymen and getting information of value to to them, rather than to try to form combinations for the purpose of establishing prices for castings either high or low, feeling that we would find ourselves on the rocks in endeavoring to make prices. There is enough of other interest to keep the Association together and make it prosper, leaving prices for the present, at least, to take care of themselves.

If it is possible for a section or branch of this Association, who make certain lines of castings, to bring their different firms together and talk over matters that are of interest to them only, we see no objections in doing so, but have great fears that the making of prices, either high or low, will soon overcome them and bring trouble.

The Executive Committee, Railways and Freights and Special Committees reported progress.

Reports from the different sections of the Price Committee were received and discussed. While reporting for his section of the committee, P. D. Wanner said that he thought that prices had somewhat improved since last meeting owing to the dry weather experienced during last year. He had noticed in past years that such a condition had a great tendency to stimulate the cast-iron pipe trades owing to the building of water works and the bringing in of additional steams, necessitating many castings and supplies. Such was the case last season and again this season. A good many of the pipe foundries East and West would be fully employed until probably the middle of the year, and, perhaps, until fall. He thought that even if the shops had only low-priced work a better feeling would be created, especially among those whose shops were not quite as well filled and others who had room to fill in at quite an advance in price. Beyond that he did not think he could promise anything.

The capacity was, of course, much beyond the demand. He believed that pipe foundries all over the country would during the year be pretty well supplied with work and at much better

prices. Through the present month, prices, had, he stated, ranged from $1.05 to $1.17, according to the different sizes. Special castings had held their own at about 2½ cents. Some had gone below that price, but their had been no reason at any time to make the cuts. Many would cut for fear some one else might take an order which they considered they ought to have themselves. The lowest price on general castings he had heard reported under this heading was for a letting on lamp posts in the city of New York. There was a letting in that city a few weeks ago for 1200 posts, made in three pieces and weighing 350 pounds. These posts were taken at $1.65. The price he thought was a record breaker. He believed the lowest price at which they had previously been supplied was $1.79. There were four competitors on this letting. One bid was $1.65, two others $1.90 and the remaining one $2.23.

Howard Evans, the secretary, reported a contract just awarded to a concern in Trenton for columns for some work in Boston at a fair price—higher than $1.65. He was not informed as to the terms of delivery of the columns, but the contract called for 250 tons.

L. B. Whitney, of A. Whitney & Sons, manufacturers of car wheels, Philadelphia, reported that only two manufacturers of car wheels were members of this association, hence there was a difficulty in arranging a meeting of this section of trade. He would, however, mention that his firm were invited, among others, to make a bid on 2400 Pennsylvania standard wheels. They duly quoted a price, but afterwards learned that the wheels could be bought at from 50 cents to 75 cents per wheel less than the price which they could offer. Their price was at $7.50. A wheel weighs from 500 to 600 pounds, and the freight at 9 cents per 100 pounds and the commission to be paid would make the net price to the party taking the contract at $7.10, or less than the iron from which his firm made wheels would cost. As soon as they learned of the offer already made they notified the parties asking for bids that they did not care to bid on business of this kind, as they could not afford to allow their names to appear on castings which could be sold for such a low price. This incident, he thought, proved that there was no necessity for quoting less than at least $7, and with a little of the nerve displayed by many of the members in the association, he had no doubt the contract might have been taken at $7.50. All in the business seemed to be afraid of each other.

E. E. Brown, of E. E. Brown & Co., reprorted progress of the small castings section of the committee.

The subject of forming sections in the association being again up for discussion, P. D. Wanner said that it was apparent that very little had been done thus far. According to the report of the Executive Committee it might be judged that it would be a dangerous step so far as the raising of prices was concerned. On this point he wished to say that he agreed with the main. He thought that it would be dangerous for any persons representing the different specialties of this association to combine with a view to raising prices to an unreasonable exextent, although it should be understood that they were not running their respective businesses for the fun of the thing. All were working for something, and the general object was to make money for the bettering of conditions. In the present condition of civilization he considered that advance could only be made by profit in their respective lines, and it was, he thought, quite lawful for them to do so. In any combination formed with the view of running a business, improving of conditions, or of bringing themselves into position to make money, they were keeping themselves with the law. It was, he said, only where a combination proposed to take hold of something to the exclusion of every one else that the law would step in and declare it an illegal procedure. It was quite advisable for an association to seek to control prices. He believed that every class of men should form associations to advance their trade, and in doing so might have to advance their prices. He understood this as the idea of the present day and regarded it as a leading feature in business in this and every other country. They were all aware of their weak-

ness and therefore united for strength. In union there was strength, and a combination or association would be strong. He thoroughly believed in the principle and they should to that extent favor the measure and try to get those interested together, although he admitted there would be a great deal of trouble in the effort to do so. Some would not want to come into the arrangement for special reasons of their own. He would recommend that such be left out, but it would be well to get in as many as possible. He had been actively connected with the pipe trade for 15 years or more, and an arrangement had been attempted many times to cover the whole country, and especially the East. Some would come in, others would stay out, and as a consequence it always ended in failure. But as he had before stated, he would be willing to stand up with any three, four or five manufacturers in the pipe trade, and adhere to arrangements for an association. There were many things he thought they could do for each other if they would only come together. A common sympathy should exist in regard to orders. What one did not make, another might, and mutual help be beneficial. He thought they should not be discouraged, but go on. It might take some time before all could be brought in, but it was no reason why these sections should not be formed. He had no doubt all discouragements could be overcome. Eventually all would unite, as those who would band together could materially affect those who declined to enter an arrangement, and they would finally wish to come in. He had great faith in the consummation of the arrangement. Very often he had found that those who appeared to be strongest had proved to be the weakest when their business was gone into, and were the first to cry for pardon. Their bravery had all been on the outside.

In regard to the possibility of the pig-iron trade affecting an arrangement for better prices, consumers should not be surprised at any time to find that the pig-iron men had been taking care of themselves in that direction. He certainly should not blame them, and would like to see it. They would probably find that in the South all the pig-iron and the furnaces would go into the hands of a few concerns and thus a step toward the control of the whole trade and the command of prices would be made. Such a step would not come unexpected to him, and if the prices were not entirely unreasonable such a course would meet his approval.

The secretary announced that a number of letters had been written to prominent people upon the subject of coke, as the matter had proved of so much interest to the trade, and in response there were representatives that evening among them for the purpose of giving any information required. Many had expressed a desire to hear more on the subject, and particularly as to how coke was manufactured from the beginning; what kind of coal was used; how long it took to turn coal into coke; what kind of water was used in cooling it, and points generally in regard to its manufacture.

The treasurer reported a balance on hand to March 1st of $349.76 with all bills paid.

The following new members were then elected :

Valentine Iron Works, J. W. Gephart, Pres., Bellefonte, Pa.; Johnson R. R. Signal Co., Hy. Johnson, Asst., G. M. and Treas., Rahway, N .J.; The Blymer Iron Works Co., R. Bahman, Treas. and Mngr., Sugar Cane Mills, Fruit Evaporators and General Foundry, Cincinnati, O.; R. Hoe & Co., Alex. W. Fyfe, Mngr. Printing Presses, 504 Grand St., New York; Davis Coal and Coke Co., Baltimore, Md.

The "Railroad and Freight Committe" reported progress.

P. D. Wanner, Mellert, F. & M. Co., Reading, Pa., representing cast iron pipe; L. B. Whitney, A. Whitney & Sons, Phila., representing car wheels; G. R. Rebmann, G. Rebmann & Co., Phila. representing jobbing work; Geo. P. Smyser, E. G. Smyser's & Sons, York,, Pa., representing structural iron castings; S. G. Flagg, Jr., S. G. Flagg & Co., Phila., representing malleable grey Iron castings; Robt. A. Register, J. Register & Sons, Baltimore, Md., repre-

senting cast iron soil pipe; E. E. Brown, E. E. Brown & Co., Phila., representing sash weights; J. Sellers Bancroft, Wm. Sellers & Co., Inc., representing loam castings.

The chairman of the following sections, representing the different trades, made his report:

Mr. Jones Wister, of L. & R. Wister & Co., Philadelphia, then delivered the following address on Coke and its adaptability for foundry use, supplementing the address he delivered at the February meeting and which in appeared THE FOUNDRY for that month. Mr. Wister said as follows:

The making of coke is a thrice told tale to those who live in soft coal districts, but we who live in the east and who use anthracite in our houses know nothing of soft coal and its coking.

Yet in our factories and blacksmith shops we thoroughly know its uses.

Almost every child knows the difference between hard and soft coal and that is about all he cares to know. If the house-keeper desires to try soft coal in the grate he is met by various excuses why it cannot be done with satisfaction and economy. But after persistence he has the satisfaction of sitting before a beautiful, glowing fire which warms and satisfies.

After a while your fire needs poking and you discover a substance different from the old familiar clinker, but hard and glowing. You have had your warmth and comfort, and you find something in your grate which you did not buy.

You have perhaps unintentionally been baking coke.

Coke is cake made from bituminous coal instead of flour.

The cake made from flour is light and cellular, from the same causes that coke, made from soft coal is honeycombed and not compact.

The ovens in both operations are almost alike in construction with slight modifications to suit the different uses. But the resulting cake becomes cake from the same causes. The slow escape of the gases under pressure of heat and the weight of the over-lying mass separates the dough in the one and the body of the pasty coal in the other. The gluten of the flour and the bitumen of the coal performing the duty of binding the cells at the point of contact, forming the entire structure into a cake.

Here, unfortunately, the resemblence ceases, for man has devised most effective methods to deprive flour of its vital principles, the phosphates and nitrates which he feeds to the lower animals, while he eats the starch, fat and sugar. But when he seeks a fuel he is actuated by motives of wealth instead health. He retains the bitumen, for without it his coke becomes dust or ashes.

While the standard coke for furnace use is hard and solid, it would seem that a coke of a less specific gravity might be advantageously used in the cupola. The blast furnace of to-day is 70 or 80 feet high, while cupolas range from 10 to 15 feet. This difference may mean much to the foundry man. A twenty-four hour coke would seem better suited to his use than a seventy-two hour coke. But caution in such experiments is suggested. It must not be forgotten that charcoal is the ideal fuel and that coke is the best imitation yet produced. But coke, when hard burnt, approaches anthracite in solidity, which is the important object for blast furnace use.

For quick combustion before tuyers discharging air under a pressure of only 8 to 10 ounces it seems highly probable that standard 72 hour coke is too compact and too much like anthracite in its nature to produce the best results in the cupola.

An atmosphere obscured by dense smoke notifies the traveler that he has reached the coke region. This smoke is the unnecessary waste and is the constant companion of the coke baker of America, chiefly because a notion has long prevailed in the iron trade that coke made in any other oven than the bee-hive is unsuited for blast furnace use. Closed ovens have been operated with perfect success in Europe for many years and are slowly being adopted in America, though sinful waste is still the rule. The utilitarian concocts, a scheme while passing through the territory by which he will save the

escaping gases for purposes of illumination which might, if put into practice in a business like way, be successful. But he soon forgets the passing thought and waste, like the brook, goes on forever. When it is remembered that 10 to 12 gallons of coal tar can be distilled from every ton of such coal as is ordinarily used for coking, it is readily seen that the waste resulting from the coking of several millions of tons a year must amount to an enormous total.

Approaching the ovens it becomes manifest that notwithstanding the great waste a large proportion of the original charge of coal remains after the voltile has passed off which is the coke. The oven had been full to the top before firing, but two days subjection to a high heat has reduced its dimensions about three-quarters, though it weight has suffered only about one-third. The resulting coke varies from 60 to 80 per cent. in different coals under similar conditions, while different processes also have a still greater bearing upon the result.

The so-called closed oven, in contra distinction to the open or bee-hive, is a foreign invention. It has been the means of saving much of the waste characteristic of the American system. Dr. John Percy says of the Appolt oven "it appears completely to fulfil the conditions of a close vessel retort."

The inventors claims that although costly, it yields more coke per charge than any other oven, as compared with the cost.

This brings me to ask whence this increased yield. In my address before your honorable body on the evening of Feb. 1st, I said if bitumen exists in a coking coal in larger quantities than than that demand for coking the mass, it remains within and permeates it and itself burns into a coke of character much more solid and compact than coke made from low volatile coals.

My claim, stated briefly, is that the increase of yield is the result of the formation of coke from the bitumen or volatile. A scientific friend discredited the theory and he has since written fully confirming his views.

My friend quotes from Dr. Percy, who is a most careful and exhaustive writer, but Percy wrote in 1875 which was before Prof. Church demonstrated that the cellular construction of coke and charcoal gave them their great value and efficiency. Percy calls coke a solid product, and in one sense it may be so-called, but he would no doubt use the word cellular if he were to re-write the definition. Dr. Percy has studied coke so fully, my friend has a most satisfactory backer, but the Dr. says on page 429 in his work on fuel that at the conclusion of the process of coking in rectangular kilns an accumulation of tarry matter always occurs immediately under the coal at the top of the kiln, which would further tend to prevent the descent of air from above as well as the ascent of currents from below, and it is there that the most solid coke is produced. Is it not a fair inference that the solidity is produced by the coking of the tar or bitumen when its solidity occurs in its immediate neighborhood.

At the Montreal meeting of the American Institute of Mining Engineers a paper was read by Mr. J. D. Pennock, of Syracuse, N. Y. On page 16, quoting from Mr. Watson Smith, he says that he believes that during the escape of the tar vapors from the decomposing mass, a portion of these must suffer complete coking, the pores of the mass becoming thus filled up, whereby the yield of the coke is increased and greater solidity is obtained.

When it is remembered that these tar vopors will coke a given amount of anthracite or other dry culm, and further that after distillation they deposit upon the walls of the retort and become baked into a coke so hard and tough that the use of a sledge is required to fracture it, there is much reason in the claim that the tar or tar vapor solidifies and becomes coke.

Upon concluding Mr. Wister was tendered the thanks of the association.

Mr. Winks, of the Davis Coal and Coke Company, stated that Mr. Ramsey, the superintendent of the company's West Virginia ovens, had intended to be present and had prepared a paper to read before the meeting. Mr. Ramsey had had a great deal of experience in the

manufacture of coke, and it was to be regretted that he had found it impossible to attend.

The chairman invited discussion on the subject of pay days. He considered it an important subject and one which the association would do well to consider at its meetings. He believed wages should be paid once a month only. In paying their hands weekly or fortnightly they were doing more than they ought to do in justice to themselves. He thought that there was no necessity for more than one pay day per month. This course, he claimed, would save a good deal of time and trouble to manufacturers. His company paid their employees every fortnight and experienced a good deal of trouble under that plan. He alluded to the Pennsylvania state law on the subject as ineffective and unconstitutional, inasmuch as it could not be carried out. He thought the subject should be open for discussion at future meetings.

Mr. Lewis, of the Waterbury Foundry & Machine Company, Conn., said that he had derived much pleasure and instruction from the meeting. He had been in business 47 years with satisfactory results, but he regretted that it had really come to the point in his section when they could not get a decent living on raw castings. This company were large builders of machinery, and it was from this branch of their business he thought that their profits largely accrued. While he would desire an advance in prices, he considered it would be very difficult to get co-operation, there being so many in the trade. He had not as much confidence as he felt he should like to have in its accomplishment, as he thought every man recognized that each concern was doing the best it could for its own interest. However much it might respect its neighbors and friends in the trade it would figure on a contract as low as possible and would then go a little lower if it found its neighbors were likely to get the job. While he admitted that it would be very well to get up a friendly and fraternal feeling, he did not think an arrangement could rest upon that. A bond would have to be in some way effected whereby a forfeiture in the event of violation of an agreement would be made. As an instance of the working of the friendly plan he cited the case of a meeting in another section called for the purpose of obtaining an advance in prices where a member, after asking to be excused a moment, in the interval rushed to the telegraph office and wired his customers: "Put in your orders. Prices advance to-morrow." He did not think that human nature varied a great deal in the different latitudes. He believed the best method for effecting an arrangement regarding prices would be the one involving forfeiture for violation.

Floor plates in his section were being made at $1\frac{1}{4}$ cents per pound, delivered on cars, and the prices of large castings were very low. He considered that the confidences enjoyed at the meetings of this association were productive of much good to its members. He hoped that the details of foundry practice would not be over-looked in their discussions. He felt that he could learn many things concerning the making and positions of cores and the insuring of good sound surfaces.

The chairman stated that at previous meetings of the association much valuable information had been elicited on the subject of foundry details. Core sand was, however, in his opinion, a good subject for discussion, as also foundry facings. He believed there were a number of gentlemen connected with the association who could furnish valuable information on these subjects. A motion was then made that the Executive Committee be asked to arrange addresses to be delivered at the next meeting on "Foundry Facings" and "Core Sand."

This has been a well attended and instructive meeting.

Mr. E. C. Lewis, Pres. of the Waterbury Farrell Foundry & Machine Co., Conn., made a very pleasing address, stating that he thought foundrymen wanted information as to how their work should be made and would like to hear an address upon the subject of Core Sand and Foundry Facings. These matters were left to the Executive Committee.

The meeting then adjourned.

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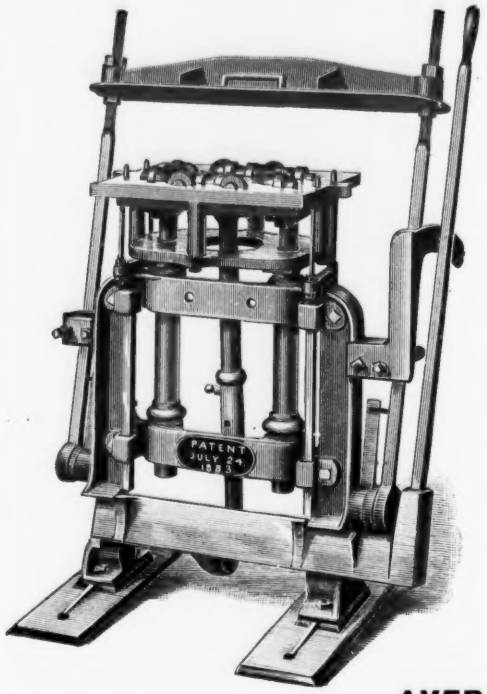

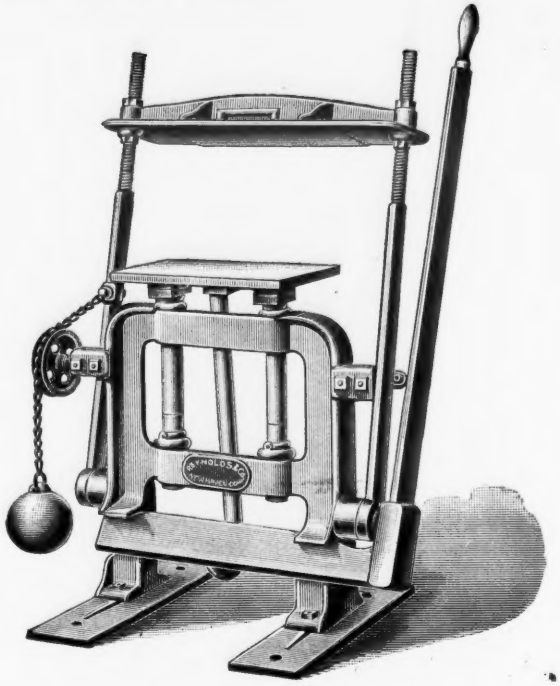

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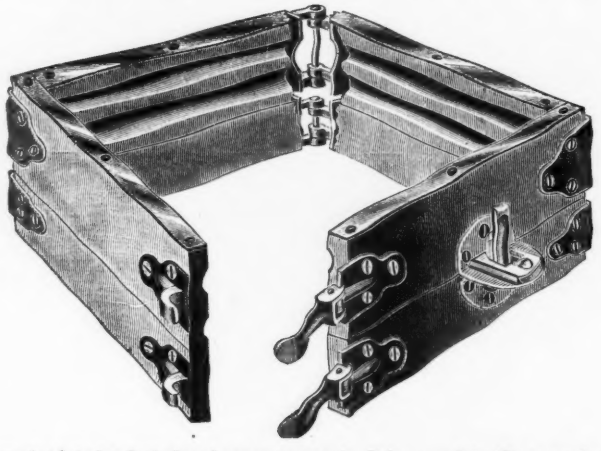

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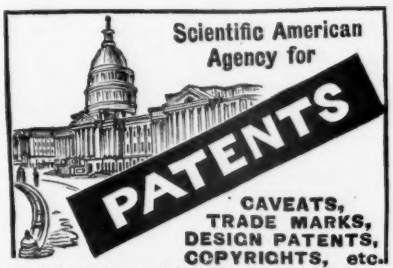

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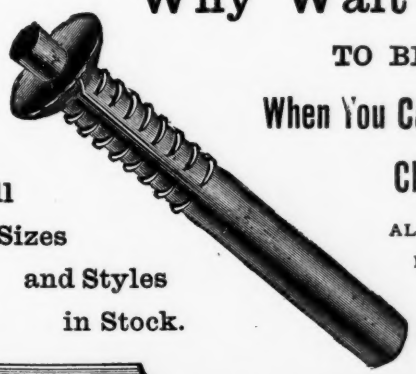

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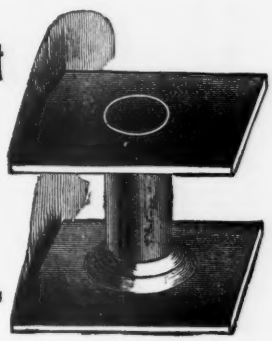

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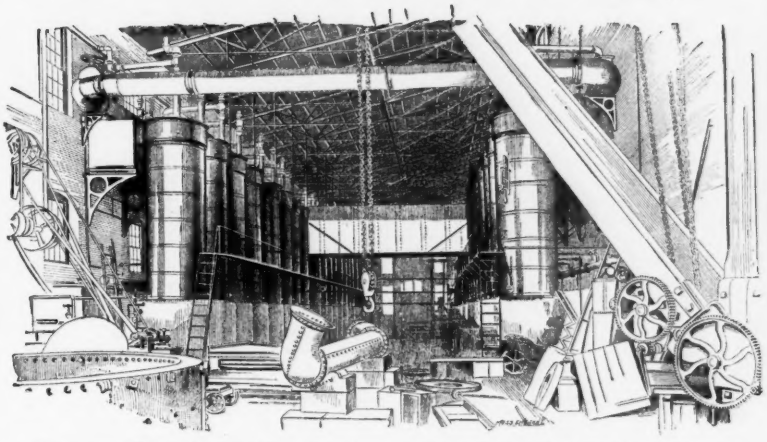

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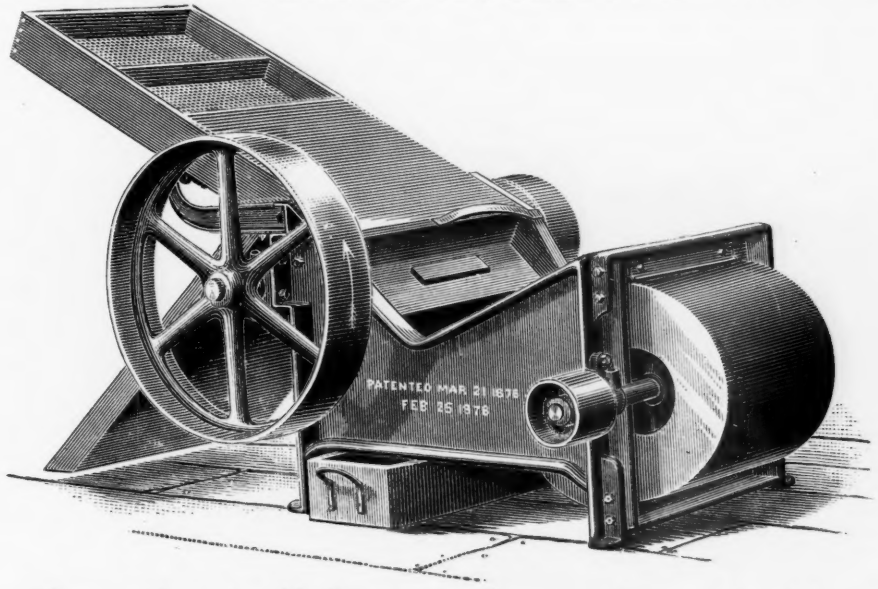

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DEAR SIR:—In reply to yours of the 24th, we would say that we have used your Salamander wash and we have found it first-class.

Yours truly,

TRELOAR, BLASHFORD & Co.

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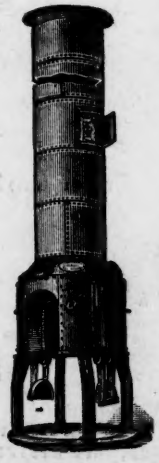
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